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NEWS

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Fall 2007

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Message from the Dean

The Evolution of Mann

Many thousands of CALS alumni will remember passing through the front door of Mann Library in all kinds of weather to study, research a project, or meet up with friends. That doorway at the east end of the Ag Quad, surmounted by the bas-relief sculpture of the arms of the State of New York, served for decades as the point of admission to one of the few experiences common to all students and faculty members of our very diverse college: a trip to the library.

For the past seven years, though, that doorway has not opened onto a circulation desk or provided access to Mann's once-towering stacks. When I began my tenure as CALS dean in July 2000, Mann's collections had been moved out in anticipation of the building's renovation, and the library had entered its interim phase in a newly completed addition on the back of the original building.

The long-needed modernizing of Mann Library was delayed for several more years when it was pressed into service as temporary quarters for the faculty and staff displaced by the need to demolish the north wing of Martha Van Rensselaer Hall. In 2003, old Mann was finally closed for asbestos removal and then gutted, arduous preludes to a complete and dramatic makeover.

The renovation is now essentially complete. The chainlink fence and construction trailers are gone from the Ag Quad, the furniture is in place, and life has returned to Mann Library. The gleaming green marble columns still stand in the lobby, and one floor above, the inlaid wood paneling and the 31-foot frieze carved by Elfriede Abbe are still intact.

Much is still recognizable to those who knew the library before, but the building has been utterly transformed. The groaning tiers of stacks have been replaced by a dazzling, five-story atrium that connects the original building to the 2000 addition (see the End Note in this issue). Manndible, a "green" café on the first floor that features wireless Internet and regional foods, has already become a central gathering place. On the second floor, students are using the latest digital technology in the exciting Kenneth J. Bissett '89 Collaborative Center, and the adjacent gallery has hosted its first exhibits and is fully booked into the spring.

Collections of the Liberty Hyde Bailey Hortorium are back from storage off campus and are on view on the fourth and fifth floors. Detailed descriptions and images of these "cool spaces" and more are available on the library's excellent renovation website, www.openhouse.mannlib.cornell.edu/move.html.

It has been a long seven years for the staff of Mann Library. But through it all, they have exhibited good cheer, professionalism, and dedication to extending Mann's already excellent reputation. Everyone deserves our thanks, but no one more than the library's outstanding director, Janet McCue. In the midst of upheaval and myriad challenges, she has radiated enthusiasm, inspired creativity and team spirit, and set the highest standards for service and innovation. It is a joy to see her finally able to preside over the 21st-century facility she has guided from start to completion.

When I cross Mann's threshold now, I see the figures of Liberty and Justice, and I smile at the state's motto beneath their feet. It says "Excelsior"—Ever Upward. Could there be better words to sum up the spirit of Mann Library?

—Susan A. Henry, PhD,
The Ronald P. Lynch Dean of Agriculture and Life Sciences

College of
Agriculture and Life Sciences
NEWS

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Short Reports

Cornell Offers New Visions to Area High School Students

On a warm Tuesday evening right before spring finals, 11 high-school seniors were under the microscope in Guterman Laboratory, an easy-to-miss building just past the vet college on Caldwell Road. Some fidgeted and flailed while others showed the sang-froid of a seasoned postdoc. But every student in Michele Sutton's New Visions Agricultural and Environmental Science Program had designed, performed, and charted the data from a semester-long research study at Cornell. And all had their posters and PowerPoints at the ready for that excruciating rite of passage for the budding scientist, the research symposium.

For want of time, better luck, or sufficient sample size, many of their research results were more or less inconclusive. Fortunately, though, the audience packed into the small conference room was friendly, made up as it was of proud parents and some of the Cornell faculty and staff members who, with Sutton, had guided the students through their first meaningful encounter with the scientific method.

Sutton had worked all-out for these students, teaching them college-level English, government, economics, and environmental science for four hours a day; beating the bushes for Cornell research mentors, internship opportunities, and college scholarships; and offering liberal doses of friendship and encouragement. A Cornell graduate alumna (MAT '02) and the 2006 New York State Agriculture in the Classroom Teacher of the Year, she runs the New Visions program in cooperation with CALS education professor William Camp, the program's faculty sponsor. While TST BOCES (the Tompkins-Seneca-Tioga Board of Cooperative Educational Services) provides Sutton's instructional services and administers the program, Cornell provides classroom space in Guterman and access to learning opportunities with faculty and staff, most of whom are based in CALS or in the College of Veterinary Medicine.

Some students in the program discover that research is not really for them, says Sutton. Others find that they love it. "This has probably been my favorite year in school ever," says Jenny Fitzgerald of Ithaca, who has been awarded a full scholarship to major in animal science at Cornell on her way to becoming a veterinarian. "I've really enjoyed being at Cornell, working with the professionals and alongside students and experiencing what it's like. It's been so amazing. And the different leadership skills and public speaking that Ms. Sutton focused on have helped all of us be more confident and proud of our work."

Jeannie Griffith

Above: Jenny Fitzgerald and Dustin Foote, high school seniors from Ithaca and Dryden, respectively, hold blue crayfish used in their New Visions research project. Both are now majoring in animal science in CALS.

Left: Newfield High School senior Amara Steinkraus entered Cornell this fall to study international agriculture and rural development.

"We did a ton of hands-on stuff," says Amara Steinkraus, Newfield High School's Class of 2007 salutatorian and senior class president, who entered Cornell this fall to study international agriculture and rural development. She got to collaborate with her grandfather, Professor Emeritus Keith Steinkraus of the Department of Food Science and Technology, in a study to determine the effects of sugar and yeast on apple wine. "It was college-level work, but Ms. Sutton made the information accessible enough that anyone could learn it. It was really nice to work on projects and subjects that were of more interest to me than they would have been in high school."

The evening after the research presentations, Sutton was already holding orientation for the New Visions Class of 2008, which drew students from Groton, Lansing, South Seneca, and both Ithaca high schools. "I have 14 great kids coming in who are truly excited about the program," she says. "Their interests range from agriculture to business to animal science to international agriculture to plant science." And, she added, "All will be in need of is research opportunities!"

For more information, see the web site: http://newvisions.tst.googlepages.com

Jeannie Griffith

Agricultural Experiment Station's Open House Celebrates 125th Anniversary

About 5,000 people—from as far away as West Virginia—celebrated the New York State Agricultural Experiment Station (NYSAES) 125th anniversary, September 15, in Geneva, N.Y., learning how crops are improved, plant pests outsmarted, and new products developed from the resulting bounty.

"The experiment station was high-tech before there were the words 'high-tech,'" said N.Y. State Sen. Michael Nozzolio '73, MS '77. Other speakers, who included Cornell President David Skorton, Dean Susan Henry, State Commissioner of Agriculture Patrick Hooker '84, NYSAES Director Thomas Burr, State Sen. Catharine Young, and Geneva Mayor Donald Cass, noted the experiment station's leading role in advancing agricultural practice and economic development regionally and nationally. Hooker spoke of extending the model established there to help meet the worldwide agricultural needs of the next 125 years, saying, "We have to think about how to feed the billions of people in the world who live on less than $2 a day."

The 870-acre campus was abuzz with activity guided by 387 volunteer staff, faculty, graduate students, retirees, and 15 undergrad Future Farmers of America members, among others. Young children with painted faces painted pumpkins, tossed rings over corncobs and with their families toured the live insect zoo. Across the way, metallic gold and silver chrysalises hung from wooden racks, as more than 300 exotic butterflies on loan from Rochester's Strong Museum fluttered about in a greenhouse.

The Gene Gun, developed at Geneva in the late-1980s, was on display, and the plant doctor was in as people lined up to find out what was plaguing their plants. Other exhibits included apple grafting, tomato pollen-crossing, and a do-it-yourself DNA extraction kit to take home and try on a banana.

Over at the food science and technology vinification and brewing lab, people sniffed Cayuga White wine—a variety developed at NYSAES.

Of five separate tours offered at the open house, one showed off the McCarthy Farm, where wild apple trees grow from seeds that were collected by USDA and NYSAES researchers in the remote mountains of Kazakhstan. The extra-hardy stock represents 6 million to 8 million years of adaptation that will be put to use improving the world's apples.

"There's a mystery about what goes on at the station in the public's eye, and I think that's why so many people came," said Gemma Osborne, who coordinated the event. "They want to know more about what we do."

See for yourself at www.nysaes.cornell.edu.

Jeannie Griffith

Rob Way/NYSAES/Cornell

Beth Gugino, left, a research associate for the Department of Plant Pathology, describes nematode damage on carrot roots to interested onlookers at the NYSAES Open House.

Alternative Energy Comes to Cornell Campus and Shoals Marine Lab

Sustainability in the 21st century has come to the Cornell campus and to Shoals Marine Laboratory on Appledore Island, Maine. Both installed solar panels as a source of clean energy.

Cornell University received a gift of 90 solar panels from grad Dick Aubrecht '66, PhD '70. In December 2006, almost 70 of the 26-foot panels were installed on the roof of Day Hall and the Cornell Store. In spring 2007, 16 panels traveled to Shoals Marine Lab. Eight panels were installed on the roof of one dorm in the spring, and the other dormitory was paneled in the summer. Batteries installed in the radar tower will store energy on bright days and supply energy throughout the summer.

The solar panels will work in conjunction with the new 7.5kW wind turbine to help power the University of New Hampshire's Atmospheric Investigation, Regional Modeling Analysis and Prediction research project (AIRMAP) equipment in the winter. Shoals Marine Lab is a cooperative venture of Cornell and the University of New Hampshire dedicated to undergraduate education and research in marine sciences.

For the last few springs, AIRMAP has been collecting incomplete data from the Gulf of Maine due to the lack of power in the winter. AIRMAP officials approached Shoals Marine Lab about clean energy sources that could be available to them year round. It took nearly two years for the turbine dream to become a reality. Many things were considered before construction began: wildlife, aesthetics, the tower's design, and building permits. The prototype can be raised or lowered, making the turbine simpler to repair and use as a teaching tool.

Now, the lab can decrease its use of fossil fuels, which powered everything on campus from light bulbs to kitchen appliances to the fresh-water pump. As Shoals Marine Lab continues to expand opportunities for students and increase enrollment, investing in clean energy sources becomes a must.

Jason Koski/University Photography

"Shoals Marine Lab was founded 40 years ago as an experiment in providing rigorous and adventurous field education in marine science for undergraduates. As we forge ahead—and augment our programs and facilities—that founding vision remains our guide. We look forward to the opportunities for growth and change that lie ahead," says Willy Bemis, John M. Kingsbury Director at Shoals.

Samantha Wickham '08

Maker of Sour Power Cherry Drink Gets $2.3 Million In Venture Funds

CherryPharm Inc., a start-up company that sells an all-natural, tart cherry sports drink developed in conjunction with Cornell food scientists, has received $2.3 million from the Cayuga Venture Fund (CVF). With this investment, CherryPharm will expand its marketing, distribution, and manufacturing capacity at its juice-processing facility in Cornell's Agriculture and Food Technology Park in Geneva, N.Y.

The shelf-stable drink retains what are believed to be the pain-prevention and muscle-damage recovery powers of sour cherries.

The CVF, which is based in Ithaca, N.Y., focuses on investing in companies commercializing technology developed at Cornell. The university is also a significant investor in CVF.

"We're pleased with the addition of CVF as a strategic partner due to their strong ties to upstate New York in general and Cornell University in particular," says John Davey, CherryPharm's founder. "This investment is an opportunity to take the company to the next level."

In 2005 and 2006, CherryPharm worked extensively with CALS food scientist Olga Padilla-Zakour, MS '88, PhD '91, to develop a shelf-stable drink that retains the anti-inflammatory, muscle-damage recovery powers of tart cherries, while maintaining its quality and taste. Padilla-Zakour, who directs the Food Venture Center at Cornell's New York State Agricultural Experiment Station in Geneva, assists small companies in developing and testing new food products and meeting state food safety compliance regulations. Currently, she and other food scientists at Cornell are working with CherryPharm to identify new product applications.

In 2006, CherryPharm hired a former Cornell graduate student in food science as director of product development and, with the CVF investment, plans to add several more employees. CherryPharm further promotes economic development in upstate New York by buying Montmorency cherries from Pro-Fac Cooperative Inc., a grower-cooperative located in Rochester.

CherryPharm's initial product offering is a fresh, not-from-concentrate juice available in 8-oz. bottles that has been developed in collaboration with leading academic and research institutions to retain maximum health benefits. The New York Rangers professional hockey team consumes the product. Further research with other professional athletes is ongoing.

The restorative properties of tart cherries are thought to be the result of phytonutrients and antioxidants like anthocyanin, melatonin and quercetin.

Jennifer Drumluk

Joe Ogrodnick/NYSAES

Sarah Valois, PhD '06, director of product development and a former Cornell graduate student, places newly labeled bottles of juice into eight-pack containers.

CALS Forensics Re-establishes National Prominence

Vinay Prabhu '08

Vodcasts, instant messaging, and iPhones may dominate recent headlines, but for dozens of CALS students, success at a good old-fashioned debate still speaks volumes. The Cornell Policy Debate Team is now ranked 13th in the nation—one behind Harvard and up from 22nd just a couple of years ago.

The team's strong national showing is due in no small part to Vinay Prabhu '08, a CALS premed biology major with a 3.85 GPA and an Academic All-American varsity debater.

"Vinay has everything that you want representing Cornell at a top national tournament—he's smart, articulate, self-confident, and charming," says Sam Nelson, assistant professor of communication and director of forensics.

Meeting competition from around the country gives the debaters national exposure, but Cornell's own rich history of on-campus debate lives on. The centerpiece of this tradition is the Class of 1894 debates held each spring. Wanting to give tournaments a bit more edge, a group of Cornellians—caught up in the late 19th century "debate craze"—established a small cash prize for the winners.

"And, through the magic of compound interest, more than 100 years later, we have a nice little prize-money account to draw from," says Nelson. "So, when these debaters are competing, they're competing not just for the thrill of winning the prestigious tournament but also for cash."

This year's Class of 1894 Debate Tournament featured over 25 teams made up of Cornell undergraduates. The intense, daylong competition hosted by CALS in Warren Hall drew students from all over campus.

"The teams debated whether the U.S. Supreme Court should overrule some of its most controversial decisions—on abortion, enemy combatant status of Guantanamo Bay detainees, affirmative action, and states' rights in relationship to gender discrimination," Nelson says. "Through the process of debate, students really got to relate to the kinds of things that our top politicians, judges, and other policymakers have to deal with every day."

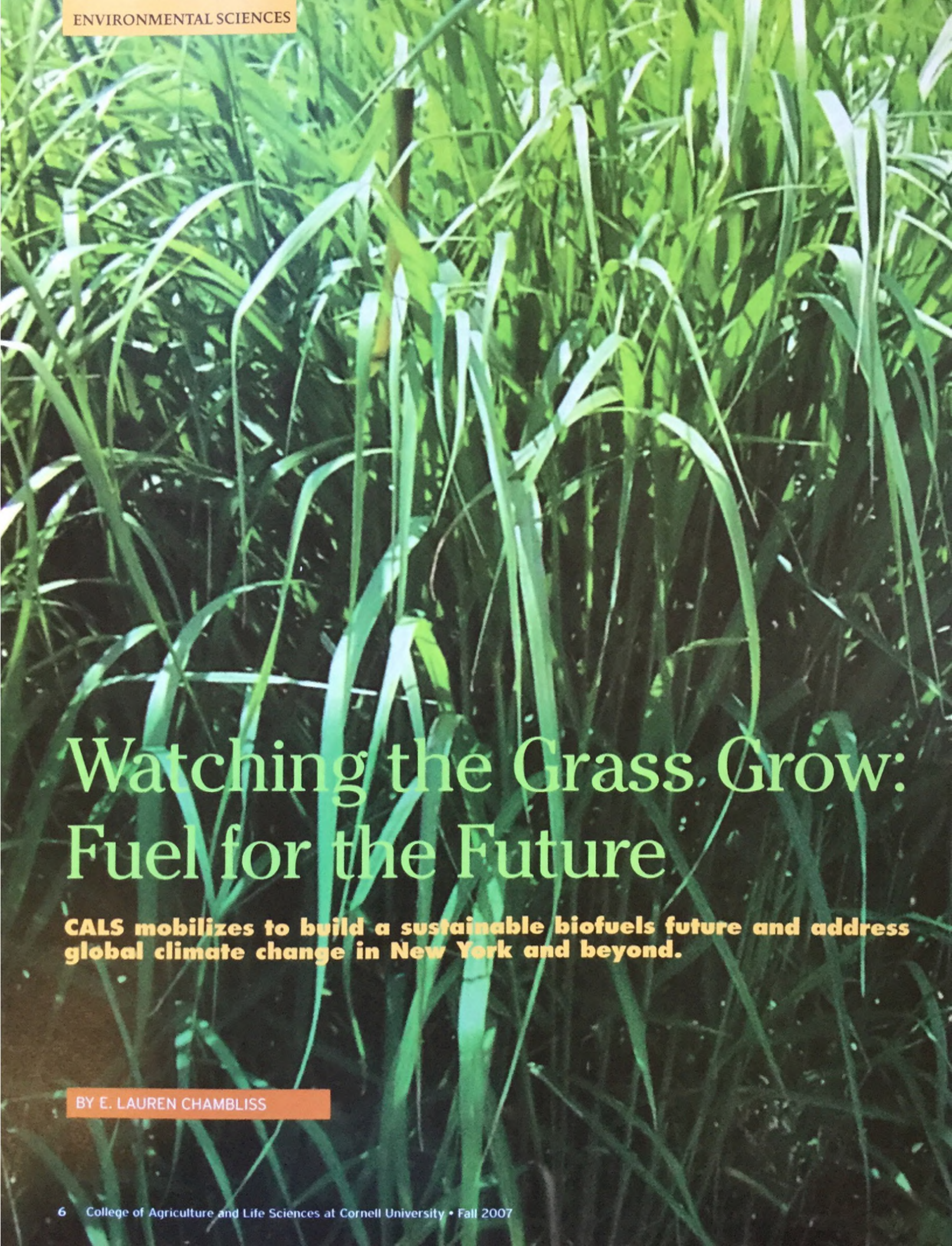
And, like in the case of Prabhu, competing in debates is very much about gaining experience applicable to life after college.

"I am applying to medical school," Prabhu says. "The ability to communicate with and adapt to patients is the same activity I have engaged in every weekend at debate tournaments."

Perhaps these transferable skills are why in recent years the team's roster has swelled—in the 2006–07 academic year, more than 40 debaters represented Cornell, making it one of the largest squads in the country.

While it may be too early to say that another debate craze is sweeping the campus, it is clear that even in the age of technology, "old school" ways of communicating aren't going anywhere just yet.

Aaron Goldweber



Watching the Grass Grow: Fuel for the Future

CALS mobilizes to build a sustainable biofuels future and address global climate change in New York and beyond.

BY E. LAUREN CHAMBLISS

In the history of New York, there has never been a field of grass with so much riding on it. Politicians and energy regulators are talking about it, environmentalists and farmers are calling to check on it, and CALS' researchers and extension educators—from biologists to bioengineers, entomologists to economists—are measuring, dissecting, and documenting every aspect of its composition, growth, and development.

For the next 24 months, no crop in the state is likely to receive more high-level attention than the trial plots of field grasses or "feedstocks" planted at the Belleville-Hendersen Central School in Jefferson County, the U.S. Department of Agriculture/Natural Resources Conservation Service Plant Materials Center in Big Flats, and other sites across the state. Along with more than a dozen other renewable-energy research projects at CALS, the grass trials hold an important key to the future of New York's new energy strategy for the 21st century.

Echoing a federal push in Washington, D.C., for domestic biofuels to supply a bigger portion of U.S. energy demand, New York Governor Eliot Spitzer's energy initiative calls for the state to obtain 25 percent of its energy needs from renewable resources by 2013. Rising concern about global climate change is also pushing the biofuels train into high gear as a renewable, "clean" energy source.

If all goes well, the grass trials, funded in part by the New York Farm Viability Institute, will supply research and development tools to create a viable industry, helping farmers grow the right kind of sustainable bioenergy crops in diverse bioregions and providing businesses and entrepreneurs with new technologies to convert grasses, wood, and other biomass crops to useable, renewable energy.

"There is little time to waste, given the nation's energy needs and global climate change," says Mike Hoffmann, director of the Cornell University Agricultural Experiment Station. "New York is uniquely situated to be a major player in the biofuels industry; and Cornell, in partnership with others, is positioned to lead."

So much is riding on the success of bioenergy crops that the New York State Department of Energy Research and Development Authority (NYSERDA) awarded contracts for two new biomass facilities, as part of a $295 million 10-year program to diversify New York's energy

Clockwise from top left: **Reed canarygrass, prairie cordgrass, and demonstration plots of grasses are planted in variety trials around New York State.**

Nick Vail waters biofuel grasses in a CALS greenhouse.

The Beef with Corn

From 2003 to 2006, the percentage of the total U.S. corn harvest used to produce biofuels rose to 16 percent, from 12 percent. But now that the federal government has adopted a goal of 36 billion gallons of alternative fuels a year by 2017, the use of domestic corn-based bioethanol to meet even half of this target would require 40 percent of that year's expected harvest, according to a study by the consulting firm, McKinsey & Co. Not surprisingly, the cost of corn has soared: average wholesale prices rose from $1.90 a bushel in 2005 to $2.41 in 2006, and corn has regularly surpassed $4 a bushel on the spot market since late 2006. Corn is expected to provide about 17 billion gallons of biofuels in 2017, with the remaining 21 billion coming from cellulosic (biomass) sources. Mexico is blaming higher corn prices for rising tortilla prices, while the U.S. cattle industry complains higher feed costs are cutting profits and driving up meat prices.

It would help to maximize the energy derived from each crop. Cornell researchers are currently studying the high biomass potential of corn stover—the stalks and other parts left over after the ears are harvested—and determining whether it can be harvested without detrimental effects on soil quality.

portfolio and reduce greenhouse emissions by using renewable energy resources.

Driving "Green" Energy

Adding urgency to the so-called "green energy revolution" is the fact that 90 percent of New York energy needs are currently met by imported energy, which is higher than the national average, according to Joseph Laquatra '74, MS '82, PhD '84, Cornell professor of design and environmental analysis. To reduce its vulnerability to high oil prices and potential supply disruptions, New York needs more indigenous sources of energy.

On a national scale, the conversion of corn to ethanol, wind, and hydro are the most advanced renewable systems, but in the longer term, "cellulosic" ethanol and other forms of bioenergy from grasses, legumes, and wood products are expected to play a larger role, especially in New York, where some portion of 1.5 million acres of idle and underused agricultural lands, as estimated by crop and soil science researchers Stephen DeGloria and Peter Woodbury '87, MS '90, PhD '87, could be turned into fuel-generating crops. Agroeconomists say not enough corn can be grown to fill the nation's bioenergy needs, thus the push is on for alternative biofuels. New York's agricultural landscape and abundant water supply make grasses and some trees with bioenergy potential, such as willow, logical crops to grow.

"Soil conditions and weather don't make us a top producer of corn," says Todd Schmit, MS '94, PhD '03, assistant professor of applied economics and management and a member of the biofuels research team. "Biomass crops, such as grasses, hold the potential to eventually yield a lot more. The trick is determining where, when, and how it is to be done."

Schmit's comments echo the sentiments of other researchers involved in CALS' multidisciplinary research and outreach undertaking, which includes finding the right grass or other biomass mixtures for New York's different bioregions, developing bioenergy and renewable systems technology to convert raw field products to energy, as well as addressing the economic, ecological, environmental, and social impacts of this relatively untested renewable-energy source.

The hurdles to overcome are great: lack of producer experience and limited knowledge about crop yields under diverse climate and soil conditions, pest management, production cost data, and questions about eventual market prices. Then there is the equally important task of maximizing the positive environmental impact, while reducing the negative, such as possibly adverse consequences for wildlife or watersheds.

There is also concern about deforestation, which would not help the net "carbon" benefit of switching to grass-based ethanol, for example, if trees are cut down to make way for forage crops. In developing nations, in particular, environmentalists fear the rush to meet rising biofuels demand will speed up forest destruction in the name of progress.

"It isn't just that we want to 'do' biofuels; it is that we want to do it right, in a manner that is consistent with global climate change, nutrient management, economic viability, and environmental sustainability," says Larry Walker, director of the SunGrant Center for Excellence and professor of biological and environmental engineering. "At Cornell, we have the infrastructure to make the difference. We have the basic research, the genetic research, the applied research, the development, the systems thinking, the education

Paul Salon '77, PhD '96 *(at far right)* leads a tour of a USDA/NRCS demonstraton site in Big Flats, N.Y., where visitors viewed grasses that have potential for use as biofuels.

and outreach, and the industrial technology that is absolutely necessary to work together to create feasible products."

The SunGrant Center—one of five regional hubs funded by the Department of Transportation in the fall of 2005 to spearhead the use of plants to produce energy, industrial chemicals, and green materials—recently awarded eight new grants for projects related to biofuels.

Fields of Grass, Researchers' Tasks

Plant biologist Jocelyn Rose is one of the researchers whose studies on plant cell-wall structure will be critical to the eventual development of new technologies to convert biomass into some form of cost-effective liquid or gas energy. One current stumbling block is the limited understanding of how plant cell walls are put together and, even more important, how they break down. Rose and other experts are focusing on developing new processes of "cellulose degradation," a necessary step in converting plant biomass to fermentable sugars and then to ethanol or other fuel. Plant cellulose is ingeniously designed by nature to resist just such degradation. One of the hopes for the Jefferson County grass project is to "find starting materials that are easier to degrade," says Rose.

Meanwhile, plant pathologists, entomologists, weed scientists, and crop and nutrient management specialists are assessing the best production systems for both warm and cool-season grasses. Professor Donald Viands, a principal investigator in the crop trials, says one of the advantages these biofuel crops have over corn is they typically take less nutrient inputs, such as fertilizer, to grow and have more fibrous root systems that minimize soil erosion. In addition, these crops are perennial, which greatly reduces the frequency of land disturbance from planting that can lead to more erosion.

The ultimate goal of the grass project is to identify which grasses produce acceptable yields of ethanol per acre and which are the most sustainable from an environmental and economic perspective, says project manager Hilary Mayton '93, MS '96, PhD '05. Early research suggests a mixture of grasses, rather than a monoculture, such as the most commonly considered biofeedstocks, switchgrass and miscanthus, could help crops be more resistant to disease, pests, variable weather, and other adverse conditions.

However, even if farmers turn over a big portion of their unused or marginal acres into biomass crops, it won't make much dent in state energy-use patterns until new, and more profitable, conversion processes are invented. Today, companies that com-

Reducing Consumption

In addition to renewable fuels, New York's Governor Eliot Spitzer has made conservation a cornerstone of his clean energy and global climate-change policies. His ambitious goal: a 15 percent reduction in state energy demand from current levels by 2015, instead of a projected 13 percent rise. It is the most aggressive plan in the nation, says Peter Iwanowicz, the director of climate change for the Department of Environmental Conservation.

Cornell's Joe Laquatra, who travels the state to educate and inform citizens and community leaders about conservation, says the governor's campaign coincides with rising consumer interest.

Extension educators' presentations through Cornell Cooperative Extension now often attract 150 to 200 people, even in small, rural communities, such as Malone and Jamestown. Higher fuel costs and concerns about global warming are contributing to residents' desire to explore solutions.

"We could reduce energy consumption in the residential sector by two-thirds without inventing anything new," says Laquatra. "People are very interested in what they can do." Residential demand alone is responsible for 27 percent of the state's energy use.

Other Cornell researchers are developing models for cities and communities to reduce "net" carbon emissions through conservation and other measures. In one study in Tompkins County, researchers discovered county emissions could be reduced by about 29 percent at no net cost to the consumer, through a combination of renewable fuel sources, conservation measures, and forestry management, among other things.

web urls

sungrant center:
www.nesungrant.cornell.edu

CALS web site:
www.cals.cornell.edu

biofuels IMPACTS:
www.cals.cornell.edu/public/impact/biofuels.cfm

Heather Hill and Nathan Kalb, summer technicians for the Biofuels Project in Genesee County, stand in a field of switchgrass. Professor Hilary Mayton manages the project.

mercially produce cellulosic ethanol use heat and acids to convert plant mass to fermentable sugar and then to ethanol, an expensive process. That is why one of the most important stops in the research pipeline for the harvested grasses and other plants is Cornell's bioengineering and biotech labs. With a recent $10 million grant from the Empire State Development Corp., Professor Walker is building a new state-of-the-art biofuels laboratory for converting perennial grasses and woody biomass to ethanol and other products.

Researchers and graduate students are examining all aspects of conversion technology, including crop and soil sciences professor Jerome Cherney, who has made nationally recognized breakthroughs in the use of "pelletized" biofuels, a potential boon for New York farmers, residents, and small businesses who could adopt the low-tech, high-yield, "clean" technology for small-scale use.

While national attention is currently focused on the production of liquid biofuels, such as ethanol and bio-diesel, biomass can produce energy by burning grass pellets, corn grain, or wood chips in specially designed stoves to produce heat. New research estimates that combustion of grass pellets could provide 20-fold greater greenhouse gas mitigation than using corn grain for ethanol production.

Meanwhile, Dan Aneshansley, MS '68, PhD '74 (Elec. Eng.), professor of biological and environmental engineering, is working with companies in the United Kingdom to create harvesting machines for another potentially viable biofuels crop, willow, being grown in test plots near the grass trials in Jefferson County.

Building new energy systems that will work for New York is especially challenging because of the state's diversity of population concentrations, geography, and climates. A multitude of factors must be considered in establishing a viable biofuels base. Researchers Woodbury and DeGloria use geospatial tools, such as remote sensing and advanced Geographic Information Systems (GIS) software, to identify and assess key environmental and economic elements of sustainability, including land-use planning, transportation analysis, and effects on water, air, and soil quality on a "spatial" or regional basis.

CALS researchers' partnerships with colleagues in Cornell's College of Engineering are also critical to the multiyear effort that is recognized as a key element of state energy policy by industry leaders and government officials, many of whom attended the annual New York Renewable Energy Summit held this June at Cornell. Colin South, president of Mascoma Corp, one of the companies building a biofuels refinery with input from Cornell researchers, told the 120 conference attendees that "the initiatives at Cornell are exactly what we need to grow."

"Right now in Washington and Albany, it is mother, apple pie, and biofuels," says Tom Sleight '79, executive director of the New York Farm Viability Institute. "There is political will and an interest to expand investment that is phenomenal. The results of this project will help define our ability to quickly plug into the biofuels agenda."

Made@Cornell:

Technology Transfer, R&D Trauma, and an Apple Named Jonamac

BY ROGER SEGELKEN

The path that leads from inspiration to invention—and on to commercial success, if all goes well—can be a long and winding road. The co-inventor of the Gene Gun, John Sanford, regressed to his youth and tried to propel DNA with a kid's air rifle, before Cornell engineers helped the plant scientist find a better way. Turfgrass expert Frank Rossi, PhD '92 killed more grass than he painted on the way to inventing removable stripes for athletics fields. And a lot of dust was on the jelly jars by the time the "Nobel Prize for Fruit Breeding" went to Cornell's 'Heritage' red raspberry—35 years after the then-new variety went public.

Despite the disappointments, the setbacks, and delayed gratification, Cornell inventors somehow persevere. Dedicated to the technology-transfer concept, they continue to believe that university-grown knowledge is too valuable to keep on the campus.

Some profit handsomely from their endeavors (the gene gun inventors, for example) and others, following the land-grant model of knowledge as public service, never see a nickel for their life's work. From the College of Agriculture and Life Sciences archives of innovation, here are some success stories:

John Sanford and the Gene Gun revolutionized plant breeding.

The Gene Shotgun

When the National Science Foundation established the original NRRFSS (the National Research and Resource Facility for Submicron Structures) at Cornell in 1979 and told electrical engineers to promote "cross-fertilization" among the sciences, the federal agency probably didn't expect what happened next, at a university with a vibrant agriculture college. A young assistant professor of plant science from the New York State Agricultural Experiment Station at Geneva (John Sanford) walked into the office of the NRRFSS director (electrical engineer Edward D. Wolf). Sanford told Wolf about his frustrations, trying to insert genes into plant cells through holes burned by lasers. They decided to try the "shotgun approach" (actually, a Crossman air rifle from a local drugstore, shooting DNA-coated, micron-diameter tungsten particles into onion cells) during the 1983 winter break. Cross-fertilization produced the Gene Gun (which propels DNA with pressurized helium, not the carbon dioxide of air rifles), thanks to the engineering handiwork of machinist John Nelson Allen in NRRFSS.

Still, hardly anyone believed that a gun could do genetic engineering—until Wolf and Sanford collaborated with molecular biologist Ted Klein, PhD '85, to conduct experiments that were finally recognized, in 1987, by the scientific establishment. Their "high-velocity microprojectiles for delivering nucleic acid" did, indeed, transfer DNA into living cells, but Sanford and Wolf needed a better name for the process. They coined the hybrid term "biolistics," from biology and ballistics, started an Ithaca-based company by that name, and built the first Gene Guns here for shipment around the world.

When technology rights to the Gene Gun were sold to DuPont in 1990, it was the largest payment ever made to the university under a patent. Biotechnologists worldwide got a more effective means of transferring genes into living tissue of all kinds. Sanford got to improve characteristics of favorite plants (ornamentals) and Wolf got proof that the science of the very small (now called nanotechnology) was applicable to a wide variety of disciplines. And the Smithsonian and Epcot got examples of technological innovation, reaching across interdisciplinary boundaries, at its very best.

Re-Markable Paint

"We killed a lot of grass" is a remarkable admission from Cornell's turfgrass expert, Frank S. Rossi, PhD '92, associate professor of horticulture. His day job is to find better ways to grow healthier grass with fewer pesticides. A moonlighting job, for a while, produced an invention and the establishment of an Ithaca start-up business, the Re-Markable Paint Company.

The invention, a paint and paint-remover system to change markings on athletic fields, was Rossi's response to the growing number of sports that Americans want to watch and engage in—and the limited number of venues for all those sports. Soccer, rugby, football, baseball, lacrosse, field hockey, men's rules, women's rules, and Little League, too, meant a lot of harried field managers who had to move lines around.

For Rossi and for Extension Associate Eva Gussack '95, MS '97, the invention game began with a 1999 call from alumnus Ken Horowitz '73 (A&S), owner of the Miami Fusion pro soccer team and a co-tenant in a stadium where other kinds of sports took place. Horowitz offered a small grant (around $100,000) for a field-striping paint that could be easily removed. February and March 2000 found Rossi and Gussack in the relative warmth of Cornell

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Designer Dirt

From the point of view of pavement, trees are not good neighbors. The loose soil needed by tree roots can't support sidewalks and roadways. And if tree roots can't find enough moisture at depth, they erupt at the surface and buckle the pavement

A pragmatic Nina Bassuk '74, director of Cornell's Urban Horticulture Institute, and then graduate student, Jason Grabosky, MS '96, PhD '99, developed CU-Structural Soil® with the needs of pavement and urban trees—in mind. CU-Structural Soil® is composed of 1-inch crushed stone that forms a weight-bearing lattice (strong enough to support the pavement and traffic above) as well as ample void space (called macropores) among the rocks for the needs of tree roots (soil, air, and water), a very small amount of water-absorbing hydrogel (to help the soil stay uniformly mixed with the stones), and, of course, some actual soil (a clay-loam will do as long as some organic matter is included).

As strong as it is, the rocky lattice structure still leaves plenty of empty space at depth for roots "to explore," as Bassuk likes to say. So the roots are less likely to invade upper levels of their "assigned space" and buckle pavement.

With CU-Structural Soil®, urban trees get what they need: uncompacted soil with adequate moisture, drainage, aeration, and fertility. And needs of pavement are met, too: a load-bearing base and, if all goes well, a little shade from nearby trees.

The last time Cornell's name went on designer dirt, it was the famous Cornell potting soil mixes and the recipe was distributed freely. This time CU-Structural Soil® is licensed by Amerq Inc., a small company in New City, N.Y. The primary reason for this is for quality control. The recipe for CU-Structural Soil® is simple, but it is easy to get it wrong. As is the protocol with other patented Cornell inventions, proceeds are shared among the university, the department of origin, and the inventor.

Whichever way technology is transferred—through free recipes or through a marketable product—the public and the plants come out ahead.

Nina Bassuk's trees are planted in CU-Structural Soil® amid pavement.

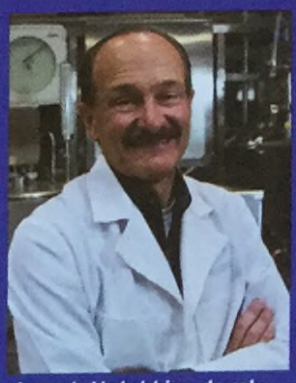
greenhouses, testing various formulations for paints and solvents. "There were plenty of nights we were covered in white paint," Rossi recounts. "We killed a lot of grass."

Their goal was every kid's dream, "invisible ink," and when they finally found the right combination, it was tested on some baseball fans' field of dreams, Yankee Stadium. The company formed to commercialize the invention, Re-Markable Paint, says the product is visually appealing, rainfast, tolerant of foot traffic, and handy for painting logos along with stripes. Unlike other marking systems, which require damaging high-pressure sprays to remove, a gentle spray with the patented solvent renders rugby field markings invisible and prepares the space for soccer or whatever. Starting locally—with clubs, schools, and colleges (including Cornell)—the company is taking aim at bigger markets: sales of marking materials for sports, land surveying, and landscaping are estimated at $250 million a year.

The remarkable system works on all kinds of artificial turf, too. And it doesn't kill grass anymore, Rossi adds.

Frank Rossi kneels on turf ready for Re-Markable Paint.

CO_2 "Pasteurized" Cottage Cheese



Joseph Hotchkiss developed the CO_2 injection method to extend the shelf life of dairy products.

Thanks to a Cornell-based technique of injecting antimicrobial carbon dioxide into the cheese curds' dressing, today, a container of cottage cheese from the grocery store lasts two or more months (unopened) in the home refrigerator. Food Scientist Joseph Hotchkiss gets the credit for the CO_2 injection method—an inexpensive and healthful way of "pasteurizing" dairy products without the heat that changes flavors. But he wasn't the first, Hotchkiss readily acknowledges. A hundred years ago, in 1907, Cornell agricultural scientists mixed raw (unprocessed) milk with carbon dioxide, left the milk at room temperature, and reported: "After three days the milk had a sweet and pleasant taste."

The man who earned a place in dairy foods-processing history (Hotchkiss has been called the "Guru of Active Packaging") knows the story behind CO_2. Earlier in his career, as a chemist for a major American brewer, Hotchkiss learned a thing or two about carbon dioxide.

Cottage cheese, a major outlet for the American dairy industry and a source of disappointment for shoppers, turned out to be an apt application for CO_2 preservation. The Hotchkiss-Cornell process injects pressurized CO_2 in carefully calculated levels—too much and the cottage cheese would be suspiciously fizzy; too little CO_2 and the process loses its antimicrobial effect—through cold tubing, then encloses the cottage cheese in gas-impermeable packaging.

Before CO_2 pasteurization became the industry standard, a container of cottage cheese was marked with a shelflife of about 21 days, "but it was barely edible for the last seven or eight," Hotchkiss recalls. Nowadays, cottage cheese is marked for an 85- to 90-day shelf life. Hotchkiss and his students open containers after 120 days, "and it's just as good as it could be."

The Museum Detectives

Everyone knows you're not supposed to touch things in museums—no matter how curious you are. Instead, by manipulating the controls of a handheld guiding device from Cornell's Human-Computer Interaction (HCI) Group, visitors become virtual "museum detectives." The result is a more profound and satisfying discovery experience, and a more memorable one than forbidden touching of museum objects ever allowed.

Cornell HCI Group Director Geri Gay, MPS '80, PhD '85, the Kenneth J. Bissett Professor and Chair of Communication, knew—from watching kids playing GameBoy devices—the lure of technical toys. And she knew that one field trip experience in Cornell's Johnson Museum of Art—when school children pair up to learn about exhibited objects, draw pictures on paper, and tell the rest of the class about "their" object—could use a high-tech tweak.

Geri Gay's students demonstrate the Museum Detective handheld guide system.

Tested first by school children from rural districts visiting one of the more inscrutable (and breakable) exhibits at the Cornell museum, the Asian art section, the Museum Detective handheld guide system can be adapted to almost any subject. Instead of listening to a droning guide, young museum visitors eagerly try their hand at a series of interactive exercises programmed into the Museum Detective. Compared to other types of museum tour methods, use of the Museum Detective handheld device succeeds in engaging young museum visitors. Within a minute or two, they are using their powers of observation and imagination to discover answers to questions they never thought they'd care about.

To help museum curators and educators design more intriguing exhibits, the Museum Detectives record data about how visitors interact with things they can't physically touch. Analysis of user data involves some background science—environmental psychology, social network theory and ethnography—before the HCI experts can offer help with the art of displaying art.

When Cornell HCI researchers checked back with field trip classes a month later, students who used the Museum Detective devices recalled significantly more about their experience. There were no smudged fingerprints to clean off precious museum objects—just lots of memories leading back to a discovery experience that was facilitated by technology and fun.

From Farm to Fork

If the Cornell horticultural scientists who develop new fruit and vegetable varieties waited for the Nobel moment, they'd be long since retired. Sometimes years of field testing and gauging the marketplace come first, before a nameless numbered variety is deemed worthy of a name. The majority of new-variety trials don't even make it that far. Those that do have earned the Cornell imprimatur—designating a new variety that shows great promise for being a cut above the rest and a grower's best bet in an agricultural environment of emerging diseases, a changing climate, and evolving marketplace expectations.

One stand-out success—among the more than 250 varieties of apples, grapes, berries, and stone fruits developed at the New York State Agricultural Experiment Station at Geneva since 1880—is the 'Heritage' red raspberry. The first raspberry specifically bred to ripen in the fall—with the quality and firmness that shippers and wholesalers demand—'Heritage' was heralded by raspberry growers because the new variety paved the way for the year-round fresh market, according to Cornell's Courtney Weber, associate professor of horticultural sciences. 'Heritage' became one of the most widely grown raspberry cultivars in the world and was finally recognized in 2004 as "outstanding" by the American Society for Horticultural Science. Experiment Station breeders had suspected as much, in the 35 years between the release of 'Heritage' and its recognition.

The same year the raspberry finally won its prize, Cornell Professor of Plant Breeding Martha Mutschler unveiled a milestone in an ongoing effort to develop an onion that is resistant to botrytis leaf blight. Using a host of techniques not available to Cornell breeders in the 19th or even 20th centuries, Mutschler's multidisciplinary team had to overcome what she called the sexual barrier that limited seed production and had stymied previous attempts to cross different species.

The traits for disease resistance were found in a wild plant species sometimes used in rock gardens—but never in commercial production of edible onions. Through a calculated series of crosses and back-crosses, Mutschler and her colleagues spent years trying to get a few seeds. When they were finally able to announce a new, disease-resistant onion variety, Mutschler was also able to announce a genetics science discovery: "This segregation for superior seed production shows that sexual barriers are under genetic control and that fecundity is probably a recessive trait derived from the onion parent."

Cornell has developed more than 250 varieties of apple

Debuting three new wine grapes ('Noiret,' 'Corot noir,' and 'Valin Muscat') last year, the Geneva Station's Bruce Reisch '76 revealed their family history. He called the 'Corot noir'

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Environmentally Friendly Feed

When Animal Science Professor Xingen Lei surveys our system for food-producing animal agriculture in an increasingly sensitive environment, he sees two things wrong: the gastrointestinal tracts of swine and poultry (as well as pre-ruminant calves) lack the enzyme to digest phytate-phosphorus in plant-based feed, so tons of phosphorus are excreted in manure to become an environmental pollutant. Yet, inorganic phosphorus—an essential supplement in animal feed—costs more and more as natural deposits dwindle.

His answer to the two-pronged problem is a patented, protein-engineering approach that puts bacteria and yeast to work producing the enzyme phytase, which could change food-animal production practices worldwide and help keep phosphorus in its place. When chickens and hogs get AppA2 phytase in feed supplements—such as Optiphos, one of the licensed applications of the Cornell technology—the animals can digest and utilize phytate-phosphorus in their feed, their manure contains less phosphorus waste, and their bones are strengthened.

The Cornell-developed phytase is said to be three to four times more effective in swine and poultry diets than other commercially available phytases. This new generation of phytase was approved by the FDA as a feed additive in 2005 and is being used in the U.S., Asia, and South America. It has the potential to help keep 90,000 tons of phosphorus a year from polluting the waterways and to reduce U.S. animal-producers' supplement bills by $360 million a year.

The experience in phytase production has the Cornell animal scientists looking at deficiencies in another animal, the human kind. Between 30 and 50 percent of the world's population suffers from nutritional deficiencies of iron and zinc—and again, phytate-phosphorus in plant-based food is what's wrong. Phytate in foods reduces the absorption of dietary iron and zinc in the human digestive system.

Research in Lei's Cornell lab (with hogs, not humans) demonstrates that supplemental phytase releases phytate-bound iron in corn and soy for hemoglobin synthesis. Because research at other institutions has shown the same effect of phytase in humans, Lei and his international collaborators in the plant world are currently testing a reasonable proposition: with genetic-engineering help from molecular biologists, crop plants such as rice should be able to produce the phytase enzyme themselves—and for the humans and other animals that consume the plants.

Xingen Lei *(right)*, with his team of assistants, uses pigs for phosphorus research.

grapes, berries, and stone fruits. Pictured here *(from left)* are an Empire apple, Corot noir and Valvin Muscat grapes, and Heritage red raspberries.

(a late-season red wine grape) a complex interspecific hybrid resulting from a 1970 cross between 'Seyve-Villard 18-307' and 'Steuben.' Thomas Henick-Kling, formerly at the Geneva Station, said the 'Noiret' "is richly colored and has notes of green and black pepper, with raspberry and mint aromas and a fine tannin structure."

With all that going for it, does a wine grape really need a fancy name? Indeed, it does, said Reisch: "A bad name can hamper a good grape."

The now-retired Geneva Station breeder, Roger D. Way, PhD '53, knew that about apples when he searched for a catchy name for a variety introduced in 1972. He polled New York growers from the shores of Lake Ontario to the Hudson Valley. Way asked garden editors from Buffalo to Boston to ask their readers: What should Cornell call the apple that came from a cross, back in 1944, between the 'Jonathan' and the 'McIntosh?' It was described as an early fall dessert apple that was also good for eating, and the variety called 'N.Y. 44428' rose from a 1955 planting of 2,474 seedlings. Out of 515 naming suggestions collected by Professor Way, seven people (including a schoolboy, eight-year-old Paul Wells) came up with 'Jonamac.'

Supergenomics:

Molecular Genetics in the Age of the Supercomputer

Cornell's experts in computational biology and statistical genomics are mining a mother lode of genomic information.

BY JEANNIE GRIFFITH

Genome sequence data are piling up faster than you can say "restriction fragment length polymorphism." Genomics has certainly come a very long way in the last dozen years. But what are we supposed to do with all this information?

"Having a genome sequence is sort of like being given a giant instruction manual in a language that you don't understand," says Charles Aquadro, professor and former chair of the Department of Molecular Biology and Genetics. "We're at the stage where we've got a whole lot of instruction manuals. We know some of the words and a few of the rules

Carlos Bustamante, assistant professor in the Department of Biological Statistics and Computational Biology

of grammar, but we certainly don't understand very many at all of the higher-order complexities, like how things are put into paragraphs and chapters."

But Aquadro, Steven Tanksley, and the other architects of the Cornell Genomics Initiative of the late 1990s foresaw the need to process and analyze the coming onrush of data. "We realized that we—as a group, as all of science—would be generating huge amounts of information that would have to be parsed through to make discoveries," says Tanksley, who is the Liberty Hyde Bailey Professor of Plant Breeding and Genetics. "And that would require a new and enhanced capability in the computational and statistical sciences."

Aquadro and several other CALS professors, including Susan McCouch, PhD '90, of Plant Breeding and Genetics, were part of a cross-campus committee that proposed the formation of a new department, Biological Statistics and Computational Biology (BSCB). "A key point in the formation of BSCB was to build a solid bridge between computer science, statistics and mathematics, and biology, with a core of expertise devoted primarily to solving biological questions," says Aquadro.

Less than 10 years later, their vision is being borne out, brilliantly. Though still a relatively small department, BSCB has recruited several outstanding assistant professors, including Carlos Bustamante, Adam Siepel '94, Jason Mezey, and Scott Williamson. Siepel and Bustamante led Cornell's participation in the multi-institutional effort to sequence and analyze the rhesus macaque genome, a breakthrough celebrated on the cover of *Science* in mid-April 2007.

Another study that Bustamante co-authored, the discovery of a gene variation that makes little dogs little, animated the cover of *Science* the week before that. More recently, Williamson was lead author (and Bustamante co-author) of a study of genetic differences within and between three major groups of people—African-American, European-American, and Chinese—that found that as much as 10 percent of the human genome may have changed in some populations within the past 15,000 to 100,000 years in response to their migration from Africa and the need to adapt to new environments.

Adam Siepel worked on the multi-institutional effort to sequence and analyze the rhesus macaque genome.

Connections across CALS and Cornell

The leaders of the Genomics Initiative decided early on not to concentrate all the new statistical and computational talent in BSCB, and many key faculty appointments have been made across CALS and in other colleges at Cornell. "Another strategic decision was to reach out to people on the experimental side," says Aquadro. "For example, we don't have human genetics here, and we don't have a medical school on this campus, but it's critical for modern biologies to have that connection." That became one of the reasons for recruiting Andrew Clark in 2002 to the departments of Molecular Biology and Genetics and Ecology and Evolutionary Biology.

Clark, the Jacob Gould Schurman Professor of Population Genetics, conducts extensive basic research using *Drosophila* as a model system for studies of obesity, immune response to infectious diseases, and even insulin resistance. At the same time that his lab is pursuing studies of genetic variation in flies, his group is also analyzing human genetic data to identify associations with cardiovascular and other disease risks. "The basic approach used to first identify genetic associations for complex traits in flies is amazingly similar to approaches that are used in humans," he says. Clark collaborates on a great variety of studies on the Ithaca campus, the farthest afield of which may be the analysis of fruit fly flight dynamics (with Mezey of BSCB, Itai Cohen of Physics, and Jane Wang of Theoretical and Applied Mechanics) that developed as an extension of his obesity research. "By far the most energetically demanding thing flies do is fly," he explains. "Going from rest to flying, there's a 200-fold increase in the metabolic rate. It is a terrific metabolic challenge."

Clark, who contributed to the analysis and publication of the first complete human genome sequence, emphasizes

Computing Better Rice: Crossing Tradition with Technology

Nearly half of all human beings on the planet depend on rice as their primary or sole source of sustenance. For Susan McCouch, PhD '90, professor of plant breeding and genetics and of plant biology, there couldn't be a more powerful reason to come to work every day. Since her graduate school days at Cornell, when she was given the assignment of developing the first molecular linkage map of the rice genome, she has worked to understand and improve upon the genetic traits that govern rice's ability to proliferate, generate high yields, and resist pests and diseases. She has now turned to Cornell's experts in computational genomics to help her identify new genes in ancient forms of rice.

Breeding new strains of rice by conventional methods is tricky. "Rice is an inbreeding species," McCouch explains. "It self-pollinates, so it doesn't exchange genes very readily. It tends to be geographically defined, because pollen can't travel across large geographical distances." The result is that aromatic or basmati rice, for instance, a cultivated variety of *Oryza sativa* that grows in Pakistan and northwestern India, cannot be easily crossed with indica, another *O. sativa* cultivar group that is native to eastern India. In fact, of the five distinct gene pools of *O. sativa* that McCouch is studying, each can produce fertile offspring with only one or two of the others.

"But each of these cultivated pools is derived from one huge, wild ancestral pool," she says. "And what's curious is that if you cross a cultivated species with the wild ancestor, *Oryza rufipogon*, it's fertile." So in order to breed rice that can better feed the world, McCouch looks back to the wild to find useful variation for crossing with cultivated gene pools.

Although all of these rice cultivars derive from the same wild ancestor, explains McCouch, certain gene pools of *O. rufipogon* have become geographically specialized in ways that resemble their genetically isolated descendents. "The underlying hypothesis is that the greatest genetic gains in terms of plant improvement come from hybridizing across these pools of variation," she says. "We want to cross back to the wild pools that are least related to the particular pool of cultivars that we're working with."

All of which generates a lot of data. "If you start thinking about all the possible ways in which genes recombine and different alleles give rise to phenotypes," says McCouch, "you can convert this into one large computational problem. And that's what we've done." She has teamed up with Carlos Bustamante, assistant professor of biological statistics and computational biology, and others on a five-year, $5.5 million project, "Exploring the Genetic Basis of Transgressive Variation in Rice," funded by the National Science Foundation. "We are likely generating 100,000 single-nucleotide polymorphisms and about 50 phenotypes on 500 diverse accessions of *Oryza sativa* and *Oryza rufipogon*," she says. "We are using that data to address questions about both diversity and the partitioning of that diversity."

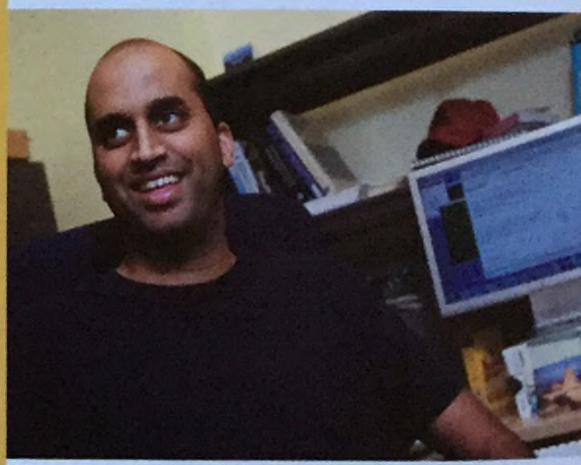
Beyond the very interesting scientific questions to be answered, both McCouch and Bustamante are excited by the opportunity to tackle research with such potential to help the world. "If you are trying very hard to come up with better ways to deliver the product, you are up against the problem that you have too much data," says McCouch. "We need massive computational skill, but coupled with the right teams of people to address questions that will ultimately deliver rice to people who don't have enough to eat. I want to do science that impacts human welfare in the most immediate sense, but I also want to do really good science. We've been really fortunate to have Carlos as a collaborator and to work with his team. The thrill is to see your science have an impact."

For more information: http://ricelab.plbr.cornell.edu

Jeannie Griffith

the central role of computers in managing genomic data. "The latest sequencing instrument installed at Cornell generates 1,000 gigabytes of data per day," he says. "It takes a serious commitment to computation to organize and make sense of data at that scale." Pharmaceutical companies have generated valuable sets of data on human genetic variation, and the Cornell group has been adept at forging collaborations to gain access to those data. Celera Genomics sequenced the protein-coding segments of the genome from 39 humans, and Clark persuaded the company to allow the Cornell group publication access. GlaxoSmithKline is now sharing genotype data from 2,000 people, whose DNA was tested at more than 500,000 positions.

Like Clark, Bustamante is primarily interested in population genetics and the genes underlying certain phenotypes, or traits. One of the main emphases of his research has been on comparing humans and chimpanzees, our closest relatives, to identify human genes that have been subject to natural selection at various stages of evolution. For example, he and Clark analyzed gene-by-gene the individual differences among the 39 human gene sets sequenced by Celera. Those analyses were then compared to the differences between the genes of humans and chimps. "We've pinpointed several categories of genes that really showed very interesting patterns," says Bustamante. "You wouldn't expect to see a protein that's 20 percent different between humans and chimps at the amino acid level, given that on average the genomes are 99 percent the same, and also given



Amit Indap, scientific researcher, worked with Bustamante on the macaque project.

that the protein doesn't vary very much within humans."

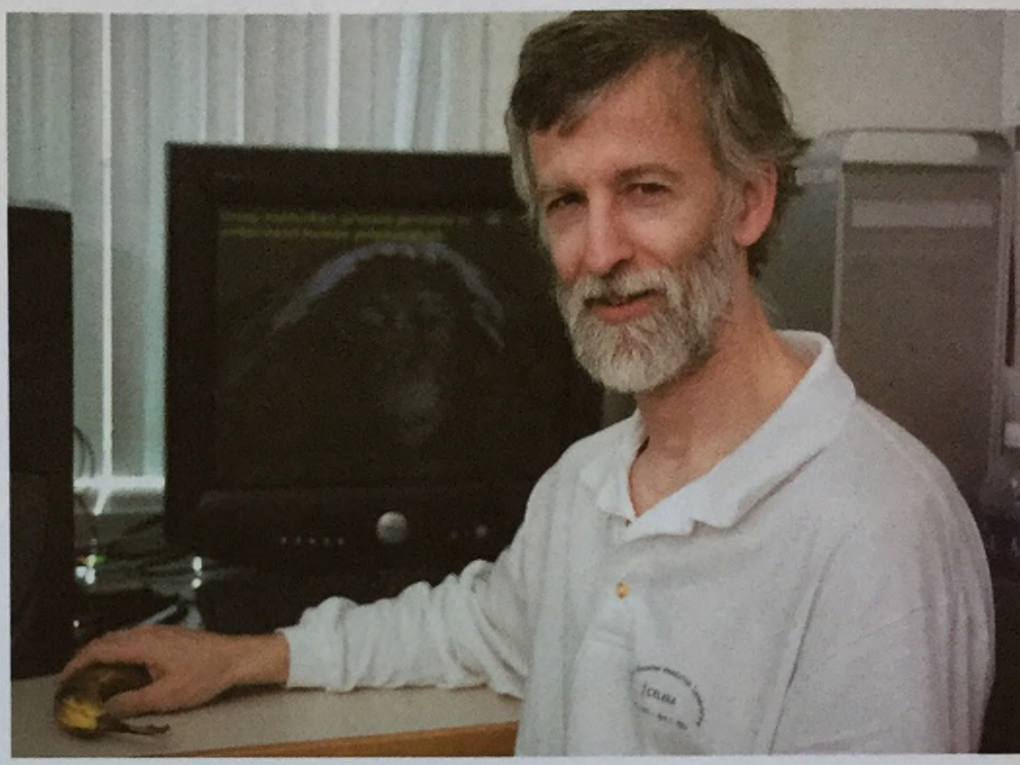
Genomic comparisons of populations within a species, like the Williamson study of human ethnic groups, offer a means to match genetic differences with differences in expressed traits, or phenotypes. This approach has particular promise as a way to get at the genetic complexities of many major diseases, as Clark hopes to do with his association studies of cardiovascular disease. Comparing a group of people with a disease to a group of people without it may reveal gene variants that are common to one group but not to the other and which thus might have a role in causing or preventing the disease.

And across Species

Comparing the genome of one species to that of another is also a key approach for discovering new genes and other key functional sequences. Genes, for example, tend to be much more similar across species than other sequences, explains Siepel, because most mutations that occur in genes compromise evolutionary fitness, while mutations elsewhere in the genome usually have no effect and are therefore more likely to be passed along.

In addition to scanning the human, chimpanzee, macaque, dog, rat, mouse, chicken, and other genomes for unknown coding regions, Siepel looks for genes that show a surprising amount of change on the branch of the evolutionary tree leading to humans. "We set up a null model for what evolution should look like if the gene is evolving in a normal way, meaning that it's either drifting neutrally or is under pressure not to change form," he says. "And then we identify genes that are evolving in a different way from what that null model would predict with statistical significance. These are genes that we infer are under positive selection pressure, meaning that new forms of these genes are favored over evolutionary time."

One gene that Siepel and his collaborators have found to be quite different in humans than in other mammals may play a role in embryonic brain development.



Andrew Clark emphasizes the central role of computers in managing enormous amounts of genomic data.

"This was a really exciting finding," he says. "It's an RNA gene—so a gene that encodes a structural RNA, not a protein—and it's expressed in the cerebral cortex, the part of the brain that's responsible for higher-level thinking. There's some indication that it may interact with a protein-coding gene that's been implicated in schizophrenia."

The macaque genome sequence is particularly important because it provides a third point of reference for human evolutionary genomic analysis. Humans and macaques diverged about 25 million years ago and share 93 percent genetic similarity; chimpanzees split off from the human branch of the evolutionary tree five or six million years ago. The ability to compare differences between human and chimpanzee DNA to the corresponding sequences in the macaque genome gives a clearer perspective on the evolutionary changes that have made us human.

"There's easily another 10 years to go in working out the functional roles of the sequences in the human genome," says Siepel. "Ultimately, we're moving toward a dynamic model of the cell and being able to produce a mathematical model that shows how all of its parts interact with one another to make an organism live."

But Siepel and his young colleagues don't anticipate ever running out of questions to answer. As Aquadro notes, "Organisms aren't designed by engineers. Organisms are designed by a process of evolutionary change that cobbles things together. The complexity of trying to look at gene interactions in whole networks ensures that tightly linked computational and statistical approaches to functional analysis are going to keep the field fully engaged for a long time to come."

For more information:

Aquadro lab: www.mbg.cornell.edu/faculty-staff/faculty/aquadro.cfm

Bustamante lab: http://bustamantelab.cb.bscb.cornell.edu

Clark lab: www.mbg.cornell.edu/faculty-staff/faculty/clark.cfm

Siepel lab: http://compgen.bscb.cornell.edu/~acs

Macaque genome story: www.news.cornell.edu/stories/April07/macaque.genome.ws.html

Williamson population study: www.news.cornell.edu/stories/July07/humanAdaptation.kr.html

Chris Barrett speaks to children in a Kenyan village.

Can Financial Markets Help End Global Poverty?

Professor Chris Barrett believes that technology, new approaches to financing aid, and international markets can pull billions of people permanently out of poverty.

BY AARON GOLDWEBER

For Chris Barrett, finding a way to end persistent global poverty is deeply personal. "If my five kids were a random sample of children around the world, three of them would be living in grinding poverty and one of them would have died by now. So, which child would I choose? I don't want to choose any of them," says Barrett.

While many children will end up living better lives than their parents did, many more are stuck in the same "poverty trap" that has ensnared their families for generations.

"Each day, 15,000 children die unnecessarily of hunger-related causes in a world of plenty," he sighs.

Yet, while the data on the number of impoverished people worldwide paint a grim portrait, Barrett is optimistic.

"In the last 300 years, the world has gone through an unprecedented escape from poverty. When you look back on the 18th century and earlier, the vast majority of people lived diseased, short lives with lots of hard work and little in the way of material comforts," he says.

Still, Barrett insists we can do better.

"While I can sit in this air-conditioned office and not have to wonder about where my next meal is coming from, I remain in the minority of the world's population," he says. "Why are one to two billion people unnecessarily and disturbingly trapped in extreme poverty?"

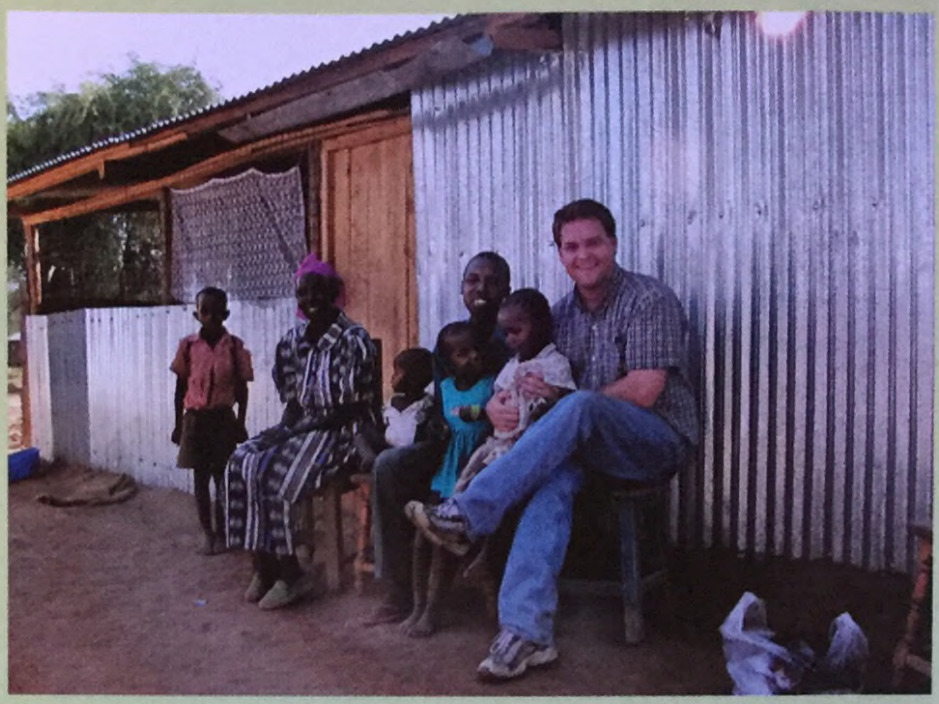
For Barrett, a professor in the Department of Applied Economics and Management, the solution to ending poverty lies at the confluence of policy, technology, markets, risk management, and finance. Within each thread there is potential to improve efficiencies and create partnerships to leverage markets and technologies.

With his research focused on Africa, Barrett does not shy away from putting his findings and his ideas into the policy arena.

"I often take 'body blows' politically, but I need to speak up about what works and what doesn't about government or NGO policy. I need to translate theoretical and empirical work into practical, actionable terms if this is to be more than just an intellectual pursuit," he says. "And it is."

Much to the point, he recently published a book entitled, *Food Aid After Fifty Years: Recasting Its Role*, in which he and coauthor Dan Maxwell MS '86 of Tufts University argue that the U.S. wrongly uses a decades-old model of food aid. As a result, he says, a lot of taxpayer dollars are misused because a strict "buy American" policy requires that all U.S.–funded food aid purchases must be American-grown and American-processed commodities and 75 percent must be shipped on American-flagged vessels.

Barrett is characteristically frank in his assessment: "A large chunk of aid today is an employment program for Americans. We congratulate ourselves on feeding the hungry, but the truth of the matter is that about 65 cents on the dollar is not going into the value of the food consumed by people abroad—it's going into shipping and administrative costs; it's going to ship line owners and agribusinesses."



Barrett hopes that his work will provide for a better future for children in developing nations.

For example, in Northern Kenya, Barrett and his colleagues can predict with 75 percent accuracy the onset of widespread severe childhood malnutrition–three months in advance. "The key is rapid response. Today, the average lag from the call for help to a food aid delivery is four to five months. Delays kill, and we know that costs increase sharply as a disaster progresses," Barrett says.

A recent article in the *Sunday Observer* (U.K.) illustrated an example in Malawi where costs for a school meal program were three times as much as necessary. Despite a local bumper crop of maize in the region, food was purchased and shipped from U.S.

"If we could just purchase the maize in Malawi, we'd be reaching a lot more kids and stimulating the local economy by supporting the local farmer. It's truly crazy that we can't," Barrett says.

Barrett and Maxwell have proposed a new food-aid strategy based on rapid, efficient response to minimize the damage done by disasters that might otherwise knock people into a poverty trap. Working with, rather than against, markets and improving agricultural productivity are central to this strategy.

Improving Technology and Taking Risks

If improving agricultural productivity is a key step on the path to reducing poverty, why don't some technologies take hold?

"Poor productivity is synonymous with poverty. Understanding how to improve productivity is central to understanding how to get people out of poverty. And understanding the constraints to the adoption of newer technology is essential to scientists and engineers who develop new technologies," Barrett says.

Risk plays a major role in limiting uptake of new technologies. According to the International Labour Organization, agriculture is the riskiest sector in the global economy because of factors like storms,

The Poverty Trap

Formulating an effective approach to ending poverty requires understanding the underpinnings of global poverty. Why are people poor? Why do they stay poor?

"A large percentage of the world's population remains mired in grinding, long-term poverty that is passed down like a family heirloom from generation to generation," explains Barrett.

Most improvements in the human condition have been ignited by improvements in agricultural productivity, he says. As people employed in agriculture generate more per hour worked, food supply grows in volume and quality, the price of food goes down, people eat better, health improves, people begin investing in nonfarm businesses, and poverty begins to lift.

Most of the world's poor live in rural areas and are employed in agriculture. Barrett says that without improvements in technology and markets, there is little hope for their lives, or their children's lives, to improve. Basic accounting shows that poor people can't invest much because they have to spend the vast majority of their income on basic sustenance. Often, they can't even maintain current levels of agricultural productivity by properly maintaining their health, their soil, and other key assets.

"Getting out of poverty requires investment—in technologies, markets, capital—so what do you do? The same model that brings talented, disadvantaged American teens to Cornell University is what we should see in Africa. Discounted lending, outright grants—well-targeted assistance enables students in the U.S. to build up valuable human capital, and the same approach can make a difference to the poor elsewhere in the world, too," Barrett says.

Barrett knows that aid has historically yielded low returns that have made governments, companies, and individuals cautious about such investments. But he insists that we can learn from our mistakes.

"Just because your crazy Uncle Morty lost a bunch of your money in the stock market, doesn't mean you should never invest again; it means invest differently," he says with a laugh.

pests, drought, and health hazards for workers. Add in price fluctuations and it's easy to see why many farmers in the developing world are cautious.

"And let's not forget that people in these countries don't have the social safety nets that we in the U.S. enjoy—health insurance, home insurance, and unemployment insurance," Barrett says. "Poor people are that much closer to the 'tipping point' where, if they cross it, they collapse into grinding poverty and it's difficult to come back."

Shocks such as drought, fire, theft, or anything that gets in the way of tending your herd or working your fields can invite collapse. Therefore, says Barrett, the people most susceptible to becoming completely impoverished by a shock tend to take the most cautious approaches.

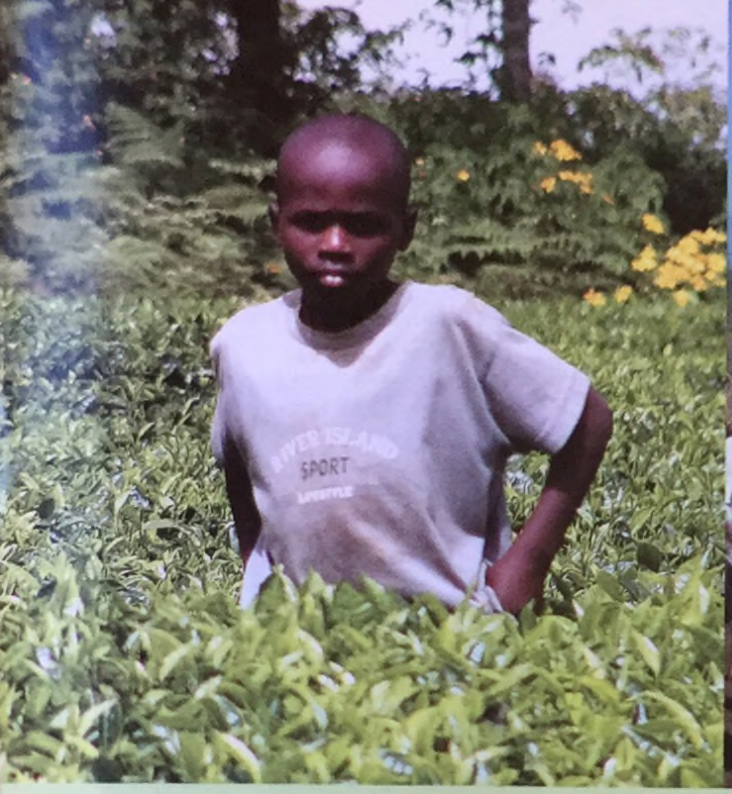
"People typically adapt their behavior to avoid risk, so they trade high risk and the potential for high returns for low risk and low returns. But low returns mean you're not going to earn very much. So you're trapped in a perpetual cycle of destitution and vulnerability by your own behaviors," explains Barrett. "You choose not to gamble on this slightly riskier but potentially very high-return farming method because it risks your and your children's future."

Innovative Ways to Finance Aid

Barrett think it's important to leverage the ideas—and considerable resources—available in the private sector to address the current shortfall in funding that can help the poor withstand a shock, implement new technology, or get an education. Presently in Africa, to move everyone who currently lives on less than $2 a day to $2 a day requires more than seven times present official aid flows.

"Nobody thinks we're going to multiply aid flows by three—much less by seven or 10," Barrett says. "So we need to stimulate high-productivity investments in technology, market infrastructure, education, and health and mobilize private financing that will dwarf public funding. Getting business involved is about getting people with different interests—businesses, aid organizations, governments—to find a common cause that will lead to the results each of them seeks," he explains.

Seeking innovative ways to mobilize financing, Barrett is working with a current doctoral student, Pin Chantarat; a former doctoral student now working in Kenya, Andrew Mude, PhD '06; and Cal Turvey, the W. I. Myers Professor of Agricultural Finance, to explore the possibility of using



Above, left to right: Farmers in Kenya pump water from the Pekerra River to irrigate their fields; a Kenyan boy stands in a waist-high tea field in Embu, Kenya; and herders in Ngambo, Zambia, treat sheep for scrapies (wasting disease).

weather derivatives (essentially weather bonds or insurance for famine prevention) to pre-finance emergency response before disaster happens.

If slow-onset disasters are foreseeable, then global financial markets offer a promising new way to finance emergency response. For example, in Northern Kenya, Barrett and his colleagues can predict with 75 percent accuracy the onset of widespread severe childhood malnutrition—three months in advance.

"The key is rapid response. Today, the average lag from the call for help to a food aid delivery is four to five months. Delays kill, and we know that costs increase sharply as a disaster progresses," Barrett says.

By having financing in place ahead of time, response can be more nimble, costs can be kept down, and more people can be helped. Barrett cites an example in Niger in 2004–2005. A drought and locust infestation threatened crops. The call went out for $9 million but nothing came in. After six months it was a full-fledged emergency that needed a $30 million response. In the span of six months the cost per person helped more than tripled, from $7 to $23.

"If you can predict these things three months out, financial markets can take care of this. That's what catastrophe bonds and weather derivatives are all about. If you can establish the probability of an event happening and how correlated this is with other events, the money can be mobilized," Barrett says.

Because rainfall in Kenya has nothing to do with pork bellies or other risky investments, those investments are potentially attractive to people looking to reduce the overall risk in their portfolio, he says. And it provides a new source of funding aid to developing countries.

"We have to start making markets work for the poor," Barrett says.

An Aid Optimist

Barrett says that inefficiencies in current aid policy are hurting the poor. Part of what bothers him are the repeated mistakes in policy by governments, businesses, and NGOs. The "good miserly economist" in him hates inefficiencies and waste. They cost poor people much more than they cost the wealthy, he says.

"But, I'm very much an optimist. It's hard to be sober when recognizing how widespread and persistent deep poverty is and not get caught up in a doom and gloom perspective—but things aren't hopeless," he says. If we've gotten 20 percent of the world's poor out of poverty already and another 30 to 50 percent is well on its way out, it's clear that we're heading in the right direction."

He also feels he's in the right place for his work to make a difference.

"One reason that I'm proud to be part of a place like Cornell is that senior leadership sees that we do have some responsibility because of our fortunate position. This work is in the tradition of land-grant extension. It's not easy, but that's what makes it all worthwhile. It's important, feasible, and challenging. And that's what a great university is all about: taking on major but solvable problems."

For more information:

www.aem.cornell.edu/profiles/barrett.htm

People

Shelley Feldman Brings International Perspective to Feminist, Gender, and Sexuality Studies

University Photography

Shelley Feldman, CALS professor of development sociology, has been named the new director of Cornell's Feminist, Gender, and Sexuality Studies (FGSS) program.

Feldman has broad interests in state-society relations, moral regulation, labor relations, and feminist epistemology. In 1993 she became director of a program then called Women and Development, which she helped to reimagine from a feminist and global perspective; with the support of others she renamed it the Program on Gender and Global Change. Feldman later directed the South Asia Program at the Mario Einaudi Center for International Studies and subsequently served as associate dean of the Graduate School.

"I'm a sociologist who works globally and transnationally," says Feldman, who has lived and worked for several years in Bangladesh. "I will bring a feminist and global perspective to FGSS. This is a wonderful opportunity to enhance cross-college exchange and to build on the exciting diversity of interests that are represented on the Cornell campus. For many years I have had the opportunity to interact with colleagues across departments and colleges, and I now hope to identify others who can similarly benefit from the variety of substantive issues and theoretical perspectives that can come together under FGSS."

Founded in 1972, FGSS offers a major, a graduate minor, and a concentration. About 30 faculty members teach 1,400 students of all majors each year in FGSS classes. The program sponsors speakers and films on campus, hosts conferences and other events, and grants prizes and awards for scholarly work.

CALS Senior Associate Dean Barbara Knuth says, "Professor Feldman brings strong intellectual leadership to this important cross-college program. We look forward to the linkages her presence will help forge between CALS faculty and those in other colleges across campus."

Feldman defines herself as a comparative historical sociologist who is excited to accept the challenge of building new synergies between social sciences and humanities. "There is such exciting interdisciplinary work on this campus," she noted. "I'd like to contribute to building opportunities for creative conversations in ways that engage theoretical and substantive issues central to FGSS. I'm delighted to direct FGSS and look forward to well representing what cross-college collaboration can offer."

George Lowery

Antje Baeumner Creating Cheap, Quick Test for HIV/AIDS in Developing Countries

Antje Baeumner is working to develop a quick, simple, and cheap immune-system test for people in the developing world. It could help HIV/AIDS sufferers in the poorest countries get appropriate treatment to extend their lives, possibly by as much as 10 to 15 years.

The work is part of an $8.6 million international consortium, called the CD4 Initiative, led by Imperial College in London and funded by the Bill and Melinda Gates Foundation. Baeumner, CALS associate professor of biological and environmental engineering, has been awarded an initial $386,000 (subject to annual renewal for four years) from the consortium to determine a way to simply assess the critical HIV/AIDS immune system factors—CD4 T-cell count, or CD4+ T-lymphocytes count—in the blood.

"When patients are infected with HIV/AIDS, the number of circulating CD4 T-cells drops significantly," explains Baeumner. "If they get the appropriate retroviral treatment, their life span can be increased by many years. CD4 counts assist in the decisions on when to initiate and when to stop the treatment, which makes this test so important.

"While such testing is routine in Western countries—and used repeatedly over the course of treatment to see if interventions are effective—it's unavailable to many people in the developing world, especially in rural areas."

For the first two years, Baeumner will work on developing a test for CD4+ T-lymphocytes in the blood that can be likened to a pregnancy test using biosensor nanovesicles (microscopic, fluid-filled pouches made of phospholipids that can deliver drugs, also known as liposomes) to enhance the signal.

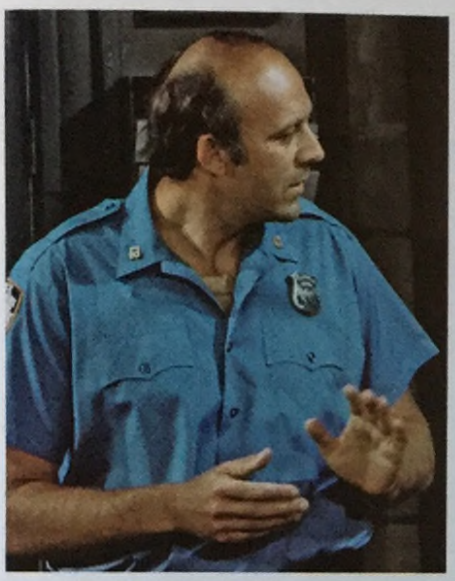
"Currently, most people in the world, such as those in Third World countries, infected with HIV have no access to detection technology," says Baeumner, noting that 40 million people live with HIV/AIDS worldwide, many in areas where electricity is unreliable or nonexistent, water quality is poor, and there are few highly skilled health-care technicians. "This test, however, is being developed to endure harsh temperature conditions and be truly simple—no batteries will be needed, for example."

In recognition of her contribution to research and science, Baeumner has been awarded a prestigious Alexander von Humboldt Foundation Fellowship from the Alexander von Humbodt Foundation and a Mercator Guest Professorship from the German National Science Foundation.

The Mercator guest professorship award for research and teaching will allow Baeumner to work during her upcoming sabbatical leave at the Institute of Biological and Chemical Microstructures and the Institute for Analytical Sciences in Dortmund, Germany, on microfluidics, dendrimers, surface chemistry, and detection (her area of expertise), to image cancer cells in vivo using nanovesicles.

Susan Lang

Barney Miller's Officer Kogan Graduates—50 Years Later



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Lindsay France/University Photography

Above: Milt Kogan grooms a horse watched by Kate Allen '08, left, and Nichole Moon '09 during a visit to the Equine Research Park for Professor Dan Brown's Introduction to Animal Science course.

Left: As Officer Kogan in a 1975 *Barney Miller* episode, "The Layoff."

Milt Kogan graduated with his CALS class at the 2007 commencement in May. The agricultural sciences major then stayed in town for two more weeks—to attend his 50th Cornell Reunion.

In a long and amazing life, Kogan, 71, has been practicing medicine (board certified in family practice) for 40 years while also appearing in more than 200 TV shows, including *Barney Miller* (as Officer Kogan), *The Rockford Files, Kojak* and *Quincy;* 16 movies, including *Lucky Lady* with Burt Reynolds, *Brewsters' Millions* with Richard Pryor, and *Bachelor Party* with Tom Hanks; and more than 200 commercials.

Oh, yes, he also has three advanced degrees—a doctor of osteopathic medicine from Philadelphia College of Osteopathic Medicine, an M.D. from the University of California (UC)–Irvine, and a master's of public health in epidemiology from UC–Los Angeles.

He has done all this while never finishing his Cornell education. In 1956 he left after his junior year to go directly to medical school.

"My dad couldn't afford the tuition at Cornell, which was $300 in the College of Agriculture, and he kept pushing me, 'enough school, you gotta go do something with your life, go be something,'" recalls Kogan. Then, at an away game, the 6-foot-4-inch Kogan, who was captain of Cornell's basketball team, met the registrar of the Philadelphia medical school. He agreed to accept Kogan with only three years of college.

"So feeling the pressure that I had to make a living, I went directly to medical school. It was a stupid, silly decision but that's what I did," Kogan says.

Serendipity and good timing would come into play yet again when, after receiving his M.D., he ran into a friend in Los Angeles who suggested that to meet women he enroll in an acting class. One of his instructors happened to be Leonard Nimoy of *Star Trek* fame.

"After medical school . . . I was so numb. . . . I went [to the class] for girls but I was finding areas in myself that were so unavailable to me with all of my education. And I became so enamored of acting as an art form. Even today, I feel it's a consummate art."

"When you're hot in Hollywood, you're hot. I got so successful that it overwhelmed any kind of medical thought."

But he never abandoned medicine; teaching world health problems for a semester around the world on a floating campus, the University of the Seven Seas, he had an epiphany.

"On that trip, I realized there were other things going on other than the American way of life," Kogan says. "And I felt guilty about being this very wealthy doctor/actor." That led to him spending almost three years in the Peace Corps in Burkino Faso, West Africa, with his wife and two young children.

Back in the United States, he would intermittently take breaks from his acting and Beverly Hills medical practice to serve two-year stints: one, in Harlowton, Mont., a small ranching community, with the National Health Service Corps; another with a farming community in Vermillion, S.D.; and another with the U.S. Army in Hanau, West Germany.

In Los Angeles, "I always kept my hand in medicine, serving, for example, as medical director for the Indian Health Service, or for facilities for the mentally retarded, or in later years with the homeless and mentally ill of L.A.'s inner city."

Then, last year, when Kogan's fourth child, Millay, graduated from Cornell's School of Hotel Administration, she teased her dad about her being the only Kogan to graduate from an Ivy League school. That prompted Kogan's wife, Susan, to push for the good doctor to take a respite from his hectic life and return to Cornell.

"My best friends through the years have always been my Cornell friends. Susan has always been enamored by them and thinks this place is the 'magic kingdom.'"

He reapplied to Cornell, and has taken the remaining 12 credits required to graduate.

"I have found it daunting, formidable—it's been quite a challenge," says Kogan of his Cornell semester. "One forgets how bright all these kids are. It's been humbling . . . but somehow, I'm still standing."

Susan Lang

People

Kelvin Grant Traveled Long Road to PhD in Plant Breeding

Ezra Cornell's vision has special meaning for some people, and Kelvin Grant, PhD '07, a plant breeder who works with corn for Iowa-based Pioneer Hi-Bred International, is one of those deeply moved by the idea of a university "where any person can find instruction in any study."

"I am half-Tuscarora Indian, and corn was very significant to my full-blooded grandmother. She introduced me to it as a little kid in rural North Carolina," he says.

When he was about 12 years old, a major crop failure all over the country devastated most of the hybrids. Grant's family's corn was regular Tuscarora White and was not touched. That fascinated him—that there were different kinds of corn and the variety made a big difference, he says.

Excited about plants, and encouraged by his mother, who has a degree in biology, he expected to study botany. But in school he was told that half-black, half-indigenous people don't become plant scientists, or any other kind of scientist.

"That was a burr in my saddle for years," he says.

Instead, Grant went to Howard University with the thought of becoming an attorney like several of his cousins. He met his wife, started a couple of businesses, enrolled at American University for a master's in economics, and then left the Washington, D.C., area to return to the family's 1,500-acre farm of tobacco, peanuts, soybeans, and corn.

Subsequently, he returned to the D.C. area to work and volunteered for a project with the U.S. Department of Agriculture in Beltsville, Md. That's when things started to fall into place.

"The volunteer work lit a fire under me to return to botany," he says. "It was a pivotal moment, a coming home to my first interest."

By then divorced and a single parent, he enrolled at the University of Maryland to study plant breeding. A professor of plant genetics helped him get a job as a corn tester all over the state of Maryland. Another professor and mentor, plant molecular geneticist Todd Cook PhD '79, sat him down after class one day and, Grant says, "harangued me for 45 minutes about why I was not going on to get a PhD."

Kelvin Grant is Pioneer's one corn breeder for all of Michigan. University Photography

Grant doubted he would get into any of the 13 land-grant schools to which he applied. He was 42, older than most graduate students, and his GPA was not strong. His first choice was Cornell, where he had dreamed of attending most of his life. An uncle, who earned an advanced degree in landscape architecture at Cornell, had taken him to see Ezra Cornell's university when he was eight years old.

Grant earned his Cornell doctorate in plant breeding and genetics between 2001 and 2007. Today, as a research scientist for Pioneer in Ithaca, Mich., he is studying abiotic stresses on corn and how the plants respond to less water and nitrogen. There is great interest in his research in the tropics, where there is no access to fertilizer, and in parts of this country, where people are concerned with fertilizer run-off.

"With each passing year, I am doing less farming. But I am in agriculture, and I am a scientist at the same time. And as Pioneer's one corn breeder for the whole state of Michigan, I can put my mark on what they are doing," Grant says.

Although he has been working only a few months, Grant is already giving back to Cornell.

He has pledged $5,000 a year for 10 years so that Mann Library can hire minority students to work at its main desk. He worked at Mann for four years as a graduate student and single parent and found it a great place to work.

"And I love Cornell. On graduation day I thought about how I was living in the basement of the ag hall at the University of Maryland with my four-year-old daughter, just trying to stay in school, when I got an acceptance letter from Cornell that meant I would be going to the top ag school in the country," Grant recalls. "At commencement, when they sang the alma mater, I couldn't stop crying. I was seeing this as a dream that had come true. I was now an alumnus of Cornell University."

Carole Stone

Three CALS Alumni Team Up to Encourage Careers in Medicine

Who wouldn't love to be able to name a building at Cornell, endow a major program, or maybe just fund a deanship? Those are very nice dreams, but for most of us, that's all they will ever be.

But sometimes a little strategy can close the gap between one's disposable income and an endowment minimum. Consider the case of Boston-area physicians Corinne Ertel '68, her brother Alan Ertel '74, and his friend Morris Diamant '74, three CALS graduates who put their heads—and their checkbooks—together to endow an annual award to an outstanding CALS senior accepted to medical school.

Alan Ertel and Diamant pledged in 1989 to fund the endowment, at the minimum level allowed, in five annual payments. After drawing up the agreement, they invited Corinne Ertel to join them in fulfilling that commitment, and the three have contributed to the fund every year since.

The path to medical school was not at all clear for CALS students in the era of Diamant, now a radiologist, and the Ertels. "There was no such thing as being pre-med in Agriculture

Corinne Ertel '68

Alan Ertel '74

Morris Diamant '74

in the 1970s," explains Alan Ertel, an orthopedic hand surgeon. Mo and I both had high class ranking and board scores in our favor but found many doors closed to us."

As a young woman in the 1960s, Corinne Ertel didn't even dream of medical school. "I was in science education," she explains. "I took all the courses that anyone else had to take for pre-med, but I never considered medical school back then." She taught biology for five years before applying to medical school. She now practices pediatrics.

"It has been particularly rewarding for me to see where the graduating seniors from CALS are going to medical school, now," says Alan Ertel.

When Corinne Ertel visited Cornell in August with her daughter, Lauren, a high-school senior, she found herself noticing the signs and plaques commemorating gifts around campus. "It motivates you to have an endowment, and it's easy to do it, particularly if a group of individuals pools its resources."

"I would like to encourage other physicians to donate to the program to enhance the status of the pre-med student in CALS," says Diamant.

For information on contributing to the Ertel-Diamant Pre-medical Fund, please contact CJ Burnett, CALS assistant director of alumni affairs and development, at 607-255-7661 or cjb30@cornell.edu.

Jeannie Griffith

ERNST & YOUNG Expands CALS Accounting Offerings

While the CALS Undergraduate Business Program (UBP) continues to rise in national rankings, currently sitting at #10 in *Business Week,* it's not about to rest on its laurels. Starting this fall, thanks to a gift from Ernst & Young, advanced accounting courses are being offered by the college, and UBP students can choose a concentration in accounting.

"Because of the hard work of Jerry Goldman '72 and Gary Kozlowski '89 and the generosity of the Ernst & Young Foundation and many Cornell alumni at Ernst & Young, the college will be able to bolster its course offerings to meet the growing expectations of its students, employers, and alumni," says William Lesser, The Susan Eckert Lynch Professor of Science and Business and chair of the Department of Applied Economics and Management.

The new accounting courses will dovetail with the existing offerings in finance, management, and marketing that are already getting the program recognition and preparing students for the workplace.

"In the wake of high-profile corporate accounting scandals and increased regulatory requirements, there has been an increased demand for students with deeper understanding of accounting practices," says Goldman, deputy vice chairman at Ernst & Young. "At the same time, the increasing pace of mergers and acquisitions has accelerated the need for finance students to understand company financial reports in far greater depth. Our business is growing to meet the demands of the financial marketplace. The need for highly qualified accounting students is greater than ever."

Goldman's office describes Ernst & Young as a global leader in professional services that is committed to restoring the public's trust in professional services firms and in the quality of financial reporting.

The $800,000 commitment from the Ernst & Young Foundation and Cornell alumni will fund proposed courses including accounting for mergers and acquisitions, professional ethics, and business risk and internal control. With these additions, undergraduate business students can now choose accounting as a concentration. In addition, support is proposed for accounting-related infrastructure including library and/or career resources.

For Ernst and Young, the additional course offerings will strengthen an already strong pool of recruits. Ernst & Young has over 130 Cornell alumni in the United States, many of whom found their way to a career with the firm through creative development of a course of study that would satisfy CPA exam requirements. Since the majority of EY's 3,000 campus hires will take the exam, these new classes will enable more Cornellians to join the firm.

With more than 700 students, UBP is Cornell's second-largest undergraduate major, yet it is one of the smallest four-year undergraduate business programs in the U.S. The UBP's 44 full-time faculty hold advanced degrees in business, economics, law, statistics, and accounting.

Aaron Goldweber

Outstanding Alumni Awards

The College of Agriculture and Life Sciences and the ALS Alumni Association will recognize the following individuals at a banquet at the Statler Hotel on Friday, November 16, 2007. Of more than 80,000 CALS alumni, since 1977, only 184 have been recognized with this awards program. The winners represent a wide range of interests and accomplishments, and each has strong roots in the college. Each has achieved success in business, professional, or other vocational endeavors; shown leadership on behalf of the College of Agriculture and Life Sciences and Cornell University; and each has made a significant contribution to the betterment of society through community service.

Elizabeth "Lisa" D. Earle has been a professor in the Department of Plant Breeding and Genetics since 1986. Born in Vienna, Austria, she came to the U.S. in 1939 and to Ithaca in 1965. After holding research associate positions in the Department of Floriculture and Ornamental Horticulture, she joined the Department of Plant Breeding in 1975. Earle served as department chair from 1993–2001. Her area of research is genetic improvement of crop plants via cell culture and gene transfer with current emphasis on fruit and vegetable crops such as melon, broccoli, and onion.

Earle has taught hundreds of students in lecture and lab courses in plant cell and tissue culture over 25 years. For the past 15 years, she has co-taught a module on plant biotechnology. As the director of graduate studies for the field of plant breeding, Earle wrote four successful proposals for the USDA's National Needs Graduate Fellowship Program and helps recruit and mentor outstanding students.

Earle has published more than 170 refereed publications in major scientific journals, including recent studies aimed at appropriate use of insect-resistant genetically modified plants. Materials from her program have been distributed to dozens of seed companies throughout the world.

For the past three years, Earle was a faculty leader of the Agriculture in Developing Nations course. She lectured at four universities in Thailand in 2005, joined a CALS delegation to Shanghai Jiao Tong University in China, and served on the BK21 joint program committee for interactions with Korea. In previous years, she served on review teams for agricultural programs in Chile, Peru, Indonesia, and Finland.

Earle was a faculty-elected member of the university's Board of Trustees from 2002 to 2006, served on the 2005 Presidential Search Committee that brought David Skorton to Cornell, and was a member of the Executive Committee of the University Faculty Senate for three terms. Earle currently serves on the General Committee of the Graduate School of the University, the University and CALS Faculty Senates, the planning committee for plant growth and functional genomics facilities in Weill Hall, and the Statler Club Board.

Earle lives in Ithaca, N.Y., with her husband, Clifford J. Earle, an emeritus professor of mathematics at Cornell. Her other Cornell connections include her brother, Thomas F. Deutsch '55 BS in engineering physics, and a daughter, Susan Earle '88 BA in English.

Wendell L. Roelofs is the Liberty Hyde Bailey Professor of Insect Biochemistry in the Department of Entomology at the New York State Agricultural Experiment Station in Geneva. Roelofs served as chair of the department from 1991 to 2007.

Roelofs has been instrumental in establishing Cornell as a leader in the field of chemical ecology and in maintaining Cornell's preeminence in the field to this day. Roelofs and those who work in his laboratory have contributed greatly to our understanding and practical use of chemical insect communication systems over the past four decades. He and his co-workers have been key in developing our understanding of biochemical pathways for the synthesis of insect pheromones, male behavioral responses to female-produced pheromones, and the evolution of chemical communication systems.

He has made prodigious contributions in the fields of chemical ecology, insect chemical communication systems, insect behavior and physiology, and insect pest management. He is considered the patriarch of the nexus of these subject domains. Roelofs has made important contributions in extension by advocating for and exemplifying linkages among fundamental science, applied research, and extension. He has played important roles in fostering an environment that has led to the department being recognized as one of the top in the field.

Roelofs has authored nearly 400 publications, many of which have appeared in prestigious journals. His research has been routinely funded by the National Science Foundation, the National Institutes of Health, and the USDA. His research has been widely acclaimed by his peers, resulting in him being awarded the Wolf Prize for International Agriculture in 1982 and the National Medal of Science in 1983. In addition, he has also been awarded the Spencer Award in 2001 by the American Chemical Society and the USDA Distinguished Service Award in 1986. He is also a member of the National Academy of Sciences, a recognition few scientists achieve (and fewer entomologists!).

The success of Roelofs's research program involves his interactions with the technicians, graduate students, post-doc fellows, and visiting scientists who have passed through his laboratory. This success has resulted in active collaborations with many researchers from around the world.

In July 2007, Roelofs became president of the International Society of Chemical Ecology—a group and research field he helped to create.

Roelofs lives in Geneva, N.Y., with his wife, Joanna.

OUTSTANDING ALUMNI AWARDS

Ejnar Knudsen III '91 is a managing partner of Kruse Investment Company, a family investment office, and Craton Capital, a hedge fund focused on public and private investments. Kruse Investment Company and Craton Capital were early investors of Cilion, a leader in developing ethanol production in North America. A board member of Cilion, Knudsen was instrumental in Cilion's plan to locate a biofuels plant in upstate New York.

After graduating from Cornell, Knudsen moved to New York City and joined Rabobank, the world's largest financial institution focused on the food and agribusiness sectors. At Rabobank, he developed an expertise in international finance and eventually assisted the CEO in the Netherlands in developing the bank's international strategy. Knudsen also established a subsidiary company for Rabobank to make venture capital investments in early-stage agriculture technology companies. As CEO of this subsidiary, he oversaw and structured investments, while holding board positions on several portfolio companies.

Knudsen formed an investment partnership, Craton Capital, with another Cornell graduate, Raju Shah '90. They pooled their funds along with those of their friends and family to jointly pursue investments. Craton now has $30 million in assets, and has achieved an average annual compounded return of 28 percent over the past decade.

In 2001, Knudsen earned a Chartered Financial Analyst (CFA) designation and left Rabobank, moved back to California, and joined as a partner of Kruse Investment Company, where he co-manages funds of the Kruse Family and Craton Capital. He helped grow Western Milling, a Kruse company specializing in grain and feed distribution, from $30 million to over $500 million in annual sales. In 2003, Western Milling formed a separate company, Phoenix Bio Industries (PBI), to construct the first large-scale ethanol plant in California.

Knudsen also finds time to give back to his community and Cornell. He founded a yearly fundraiser for a local college, raising more than $200,000, and he helped save a community service center at the Goshen School by having Western Milling purchase the facility. While living in New York City, he served as district director on the CALS Alumni Association Board of Directors. In California, he hosts Cornell alumni events. He collaborates with several CALS professors and currently serves on the Dean's Advisory Council. Knudsen was a presenter at the Cornell Entrepreneur Network's Alternative Energy Presentations conference in 2006 and the Entrepreneurship@Cornell 2007 conference.

Knudsen lives in Exeter, Cal., with his wife, Elizabeth.

Raymond E. Borton '53 retired in 1996 as senior economist with the California State Office of Economic Research. Previously, Borton had served as an agricultural economist in the California State Department of Food and Agriculture (CDFA).

After graduating from Cornell, Borton was an editor for the College of Agriculture, Experiment Station, and Extension Service at the University of Connecticut. Next he served with International Voluntary Services in South Vietnam. After earning graduate degrees, Borton joined the Agricultural Development Council, first as a staff member in New York and later as a council associate and visiting professor at the University of the Philippines. In the late 1960s, he worked in Ethiopia's Ministry of Planning as an agricultural economist employed by Stanford Research Institute.

When Borton became state economist for CDFA, there was no systematic accounting of the vast array of agricultural specialty crops grown in California. In his first two years at CDFA, he persuaded the California office of the National Agricultural Statistics Service to create a set of data schematics and computer programs that would codify the existing sporadic reports. Borton then wrote a detailed instruction manual for the local county commissioner staff and developed training classes.

Borton led a campaign within the agricultural community, jointly with the California Farm Bureau, to persuade all the county commissioners to prepare similar annual reports. In 1978, the first summary was published. This reporting process and compilation system is still used to generate annual reports.

In 1982, Borton began a similar process to examine the California exports of agricultural crops and products. Between 1984 and 1989, he perfected the system used today.

Borton represented California's agriculture sector at the Department of Finance's California Economic Outlook Conferences for 14 years. He also met regularly with agricultural visitors from throughout the world's agricultural production system.

In the mid-1980s, Borton played a significant role in organizing the economists in the Sacramento region, and having this group accredited by the National Association for Business Economics. The group came to be known as the Sacramento Economics Roundtable (SER), and Borton received its Founder's Award in 1990.

Borton is well-known for his volunteer leadership at the International House in Davis, which serves international students, scholars, and other visitors and promotes international understanding and world peace. He received its Volunteer of the Year award in 2005. Borton and his wife, Verena, were honored with the City of Davis Citizen(s) of the Year award in 2005.

Borton also served as the Northern California director on the CALS Alumni Association board of directors from 1996 to 2002.

Raymond and Verena Borton live in Davis, Cal. They have three children: Christopher (deceased), Benjamin, and Stephanie.

Outstanding Alumni Awards

Karen L. Houseknecht, PhD '94, is the newly appointed vice president of biology at ASDI, Inc. (headquarters in Wilmington, Del.). ASDI is a multinational corporation made up of a group of companies located within the U.S., Eastern Europe, and Asia dedicated to enabling drug discovery via a portfolio of products and services. Houseknecht is responsible for expanding the scope of the business into the biological sciences. She reports directly to the CEO and her responsibilities include growing the business to include ADME and toxicology divisions as well as to provide leadership on scientific strategy. Houseknecht also currently serves as an adjunct professor in the Department of Holistic Counseling at Salve Regina University in Newport, R.I., and as an adjunct assistant professor in the Department of Animal Sciences at Purdue University.

After receiving her PhD in Animal Science, Houseknecht became a research fellow at Harvard Medical School in the Department of Endocrinology and Metabolism at Beth Israel Hospital in Boston. Her research focused on elucidating the mechanisms of insulin action using transgenic mouse technology to better understand the pathology of diabetes and obesity. Houseknecht was also involved in some of the first research on the newly discovered obesity hormone, leptin.

In 1996, Houseknecht became assistant professor of endocrinology and metabolism at Purdue University and adjunct assistant professor of medicine at Indiana University Medical School. In 1998, she served as honorary visiting professor of clinical medicine at the Karolinska Hospital in Stockholm, Sweden.

In 1998, she was recruited to Pfizer Global Research and Development in Groton, Conn., where she served until recently as associate research fellow, specializing in diabetes discovery, in the Department of Cardiovascular and Metabolic Diseases. In 2005, Houseknecht received the Pfizer Global Research and Development Achievement Award.

Houseknecht has been a great advocate for women in science. As a graduate student, she co-founded the Cornell Women in Agriculture and Life Sciences. In the workforce, in 2005, she received the Power of Women Award, and in 2006, she was awarded the Women of Innovation Award for Large Business Innovation and Leadership by the Connecticut Technology Council. Houseknecht is a board member of the Association for Women in Science (AWIS).

Houseknecht works to improve the lives of women and children in Guatemala, the home country of her adopted daughter. She travels there to deliver much-needed supplies to indigenous families and orphans thru Project Hope and other organizations.

Houseknecht lives in Old Saybrook, Conn., with her husband, Charles Funkhouser (MEng '96), and their son, Aidan, and daughter, Aislinn.

John W. Lincoln '60 is president of the New York Farm Bureau, Inc., and New York Farm Bureau Member Services, Inc. He also is in a partnership at Linholm Dairy LLC, a registered Holstein dairy farm in Bloomfield, N.Y., with his wife, Anne, daughter, Julie, and son, Michael. In his role as president of the Farm Bureau, Lincoln leads the largest and most influential grassroots membership organization in New York State, with a statewide membership of more than 30,000 families. In this role, Lincoln has become a well-known and well-respected spokesperson for the agricultural industry. His views on issues are sought regularly by legislative leaders, agency personnel, and industry experts at both the state and national levels.

Lincoln has been involved with the New York Farm Viability Institute, which was formed to help ensure the future success of New York's agricultural industry. He has served as its chairman for the past three years. In this role, he has presented testimony to Congress, the state legislature, and regulatory agencies on many agricultural issues.

Serving on the American Farm Bureau Board of Directors, Lincoln represents the agricultural industry nationally on behalf of the organization's 6 million member families.

As a member of the USDA Agriculture Trade Advisory Committee, Lincoln has participated in many fact-finding and trade negotiation trips abroad. Lincoln has also served as a longtime member of the Farm Family Insurance Company Board of Directors.

Since his graduation, Lincoln has continued to serve CALS and Cornell. He was a member of the Dean's Advisory Council and has worked with Dean Susan Henry on retaining state funding for the college and its programs. CALS, Cornell Cooperative Extension, and the New York Farm Bureau, under Lincoln's leadership, have developed a close working relationship.

In March 2005, Lincoln was honored as the recipient of the Rodney Lightfoote Agricultural Viability and Innovation Award for Ontario County. This award is presented annually by Cornell Cooperative Extension of Ontario County, in collaboration with the Ontario County Farm Bureau.

In his community he is a member of the Ontario County Farmland Protection Board and has been active with the East Bloomfield town government. He has served in many capacities on the Ontario County Farm Bureau Board of Directors. He also serves on both Senator Hillary Clinton's and Congressman Randy Kuhl's Ag Advisory Committees.

Lincoln lives in Bloomfield, N.Y., with his wife, Anne. All their children are CALS graduates: Julie Pellett '92, Christie Lincoln '94, David Lincoln '96, and Michael Lincoln '97.

Outstanding Alumni Awards

Peter B. Saltonstall '75 is the co-owner of King Ferry Winery with his wife, Tacie Saltonstall. King Ferry Winery is a small vineyard and winery on the east side of Cayuga Lake that produces fine wines using many time-honored European techniques. Delicate *Vitis vinifera* grapes are hand-tended and selectively picked to produce premium wines under the Treleaven label.

Saltonstall is a true leader in the New York State wine industry. His wines are highly respected within the industry and by a large customer base. In particular, Treleaven Chardonnay and Riesling are very sought-after vintages. Saltonstall had a "Triple Crown" win at the International Eastern Wine Competition with his 2005 Dry Riesling; it won Best in Class: Dry Riesling; Best Riesling in the Riesling Championship; and Best White Wine of the competition. There were more than 2,000 entries from 35 states and 12 countries.

Every step in their winemaking is personally attended to-right through to the approval of each bottle and the hand labeling of each vintage. The winery now produces approximately 10,000 cases of wine per year.

Saltonstall also is a stalwart volunteer for the New York State wine and grape industry. He is a longtime member and current chairman of the board of the New York State Wine and Grape Foundation. Saltonstall also has served as chairman of the Foundation's Research Committee. He is a longtime member of the Cayuga Lake Wine Trail. Each year, Saltonstall and the staff at King Ferry Winery host wine tastings and often are an integral part of fund-raising efforts by organizations. Recently, he and Tacie have been involved with efforts to raise awareness and funds for breast cancer research.

Since 1997, Saltonstall has helped plan the CALS annual Vinification and Brewing Lab Gala dinner and auction to support the lab at the Agricultural Experiment Station in Geneva. Saltonstall was instrumental in moving the gala to New York City this year to draw in greater participation from Long Island wineries and New York alumni. The dinner was a huge success with over 200 alumni and guests attending and raised over $22,000 for Cornell's enology and viticulture program.

Saltonstall is a tremendous advocate for Cornell and the college. Since 2005 he has served on the Dean's Advisory Council. Saltonstall initiated and continues as chair of the CALS-sponsored New York State wine tasting event held during Reunion Weekend. In support of the college's enology and viticulture programs, he opens up his vineyard and winemaking facility for collaborations with Cornell researchers and extension experts. He has also been a guest speaker at several CALS Alumni Association events.

Saltonstall lives in King Ferry, N.Y. with his wife, Tacie.

Robert G. Tobin '60 retired in July 1998 as chairman of Stop & Shop Supermarkets. After graduating from Cornell, he began his career with Stop & Shop and worked for the same company until he retired—three different times! Tobin rose from a store trainee to become its president and CEO. He also retired as president and CEO of Ahold USA, Inc., and Interim CEO of U.S. Food Service.

For more than 40 years, Tobin has been widely regarded as a leader in the retail food industry. While at Stop & Shop, he was revered by his colleagues for his humility, wit, and ability to identify strengths and weaknesses in a company's strategy by simply "walking the stores." His peer CEOs in the industry routinely sought his advice—and seek it still—for his no-nonsense wisdom, uncommon ability to think like the customer, and commitment to ethical behavior. Under Tobin's tenure on Stop & Shop's executive team, the company grew from a modest family-run company in Boston to the market leader in New England.

Tobin's leadership abilities were so admired that when he retired, within days, the parent company, Royal Dutch Ahold, asked him to become CEO of their entire fleet of stores in the United States and to join its board of directors in the Netherlands. When, three years later Tobin retired for a second time, he was asked to come back to assist Royal Ahold in dealing with a major internal accounting fraud in one of its divisions. Ahold needed someone with a reputation for high ethical standards in the food industry and investment community. With little deliberation again, Tobin agreed to come back.

In 1999, the Food Marketing Institute awarded Tobin its highest distinction: the Sidney R. Rabb Award.

Tobin's commitment to Cornell is equally fierce. In 1993, Tobin was named chair of Cornell's Food Industry Management Program's brand-new industry advisory board. He also is a founding member of the Applied Economics and Management (AEM) Undergraduate Business Program Advisory Council—and he has never missed a meeting.

Tobin was honored in 1997 as a Foremost Benefactor of Cornell; and with his wife, Audrey, has endowed the Robert G. Tobin Professor of Marketing in CALS. Since 2004, he has served on the Dean's Advisory Council. Tobin also has taught an Executive-in-Residence Seminar in AEM for two years. Tobin also has accompanied AEM's Food Marketing Fellows on a trip to Ireland.

His charitable work includes leading Stop & Shop to raise several million dollars for cancer research through the Jimmy Fund at the Dana Farber Cancer Institute in Boston.

Tobin lives in Warren, Conn., with his wife, Audrey. They have two daughters, Tracy Lynn Tobin '90 (A&S) and Kelly Tobin, and two grandchildren.

It's Never Too Late to Get Involved

University Photography

Mitchell E. Kornet
President of CALS Alumni Association

It is my honor and privilege to lead the College of Agriculture and Life Sciences Alumni Association. We have over 50,000 graduates of our college throughout the world serving society in a myriad of occupations. Thanks to the progressive programs of the college, our faculty and alumni have made CALS the number one College of Agriculture and Life Sciences in the nation.

As an Animal Science major in 1972, I came to Ithaca with the hope that I was indeed intelligent enough to do well at Cornell and be admitted to a veterinary college. Then came the first set of prelims. I wouldn't say that they were a total disaster, but I knew that my grades weren't good enough for veterinary college. After my prelims, I called my parents to tell them that there were so many smart people at Cornell, and I wasn't one of them. I felt like I didn't belong at the college and I didn't think I would ever make it into veterinary college.

What I found out later in the semester was that many of my classmates made a similar call home. Once I learned that we were all in the same situation, I did some soul searching to figure out how I could improve my academic standing. The answer was simple: work harder. And I did work very hard. I developed a work ethic that allowed me to learn and excel in my courses. I was admitted to Cornell's College of Veterinary Medicine after three years of undergraduate study.

My Cornell connection certainly has been a big factor in my success as a veterinarian. It was clear that the Cornell culture, and the work ethic that it fostered, empowered me to develop a lifetime of self improvement through education.

Being a CALS alumnus allows you to take advantage of many opportunities. Whether it be attending lectures on or off campus, participating in networking events, or taking a trip back to Ithaca, being an alumnus makes you a permanent member of the Cornell family. So please support CALS by joining our Alumni Association. Your dues and participation go a long way toward supporting current students and ensuring that CALS remains a leader for future generations of Cornellians.

Mitchell E. Kornet '76, DVM '79

Veterinarian Is New President of Alumni Association

Mitchell E. Kornet '76, DVM '79, was elected president of the CALS Alumni Association this June. Dr. Kornet has served his community for over 25 years in private practice as a small animal veterinarian in Hicksville, N.Y.

Dr. Kornet has had his eye on Cornell since he was 13 years old when he decided that he wanted to become a veterinarian. He grew up in Bayside, Queens, N.Y., and was a student at John Bowne High School, the only high school that had a program in agriculture in New York City. In high school, he worked on dairy farms during his summer vacations and was an FFA leader.

Active in the CALS Alumni Association, Dr. Kornet has served as district director for Long Island since 2003 and has been secretary of the association and vice president of events. In addition, he was the chair of the Awards Committee, which chose the Outstanding Alumni and Faculty/Staff Award winners. Dr. Kornet is also a member of Cornell Alumni Admissions Ambassador Network (CAAAN) and has been a leader in the Cornell Club of Long Island. In addition, he has advised and mentored Cornell students through the CALS Alumni Career Link.

In 1998, Dr. Kornet became part of a group of veterinarians who organized a Disaster Preparedness Plan for veterinarians and pet owners on Long Island. The group was called into action on September 11, 2001, to mobilize veterinarians and veterinary technicians to treat the search and rescue dogs at the World Trade Center. Dr. Kornet's job was to arrange around-the-clock veterinary care for the dogs. He was given Long Island's Veterinarian of the Year Award in 2001 for his work.

Cornell is a family affair for Dr. Kornet. His wife, Renee, a practicing speech pathologist, came to Ithaca in 1977 after they were married and did research in the College of Human Ecology. His daughter Allison graduated in 2004, and daughter Robin is in the class of 2008, both communication majors in CALS. August 2007 marked the 15th Cornell move-in for Dr. Kornet: seven for himself, four for Allison, and four for Robin. He loves visiting Ithaca and likes to say that Cornell is even better the second time around.

1930s

Phillip G. Wolff '38 of San Diego, Calif., enjoys playing golf at his summer residence in Saranac Lake, N.Y.

1940s

E. William Kellogg '43 of Cape Canaveral, Fla., and his wife, **Fay Kellogg '48,** live in Florida for six months of the year. They also enjoy spending time with their son, **Mark Kellogg '80,** in the Thousand Islands in upstate New York State.

E. Travis York, PhD '49 of Gainesville, Fla., was presented the Ken Pruitt Lifetime Achievement Award by the Florida Student Association in Tallahassee, Fla. York is a major figure in Florida agriculture throughout the latter half of the 20th century; and is responsible for organizing the University of Florida's agricultural program in its current form and the Institute of Food and Agricultural Sciences. He also led the effort to establish the state's first veterinary college.

John Babcock '45 of Ithaca, N.Y., won an Emmy award from the National Academy of Television Arts and Sciences and a 2007 NY Emmy Award, both for the musical composition and arrangement for his documentary *Farmboy,* which was broadcast on WSKG, Binghamton. Plans are under way for national broadcast. Babcock's old family homestead is the former Turback's Restaurant on Route 13.

1950s

Charles K. Laurent, MS '50, PhD '52 of Bartow, Fla., was featured in his local newspaper for his vast career, from Air Force pilot instructor to professor at the University of Maryland and University of Georgia, to a general manager of a feed company. He and his wife have three adult daughters.

Conrad J. Kercher, MS '52, PhD '54 of Laramie, Wyo., recently celebrated his 60th wedding anniversary with wife, Lynda. He has taught at the University of Wyoming's animal department for 42 years while she has taught there for 22 years.

John Babcock '45 with Barbara Babcock, 1930s

1960s

William D. Sanders '64 of El Paso, Texas, was appointed to Western Refining Inc.'s board of directors. Sanders is a founder and co-chairman of Verde Realty, a real estate investment trust focused on the U.S.-Mexico border region.

Phyllis W. Barlow, M.Ed '67 of Groton, N.Y., enjoys tending to her birds and orchids.

Matthew S. Rosen '67 of West Des Moines, Iowa, is chairman of the Greater Des Moines Sister Cities Commission. He has served on countless boards for many organizations, including the United Way of Central Iowa, Latinos Unidos, and the American Association Botanical Gardens and Arboretum.

(Former President) Lee Teng-Hui, PhD '68 of Taipei, Taiwan, continues to be a political activist fighting for freedom and rights for the people of Taiwan.

Frank S. Perotti '68 of Ludlow, Vt., has been elected as the new superintendent of Springfield New Hampshire's Supervisory Union. Perotti received a master's and doctorate degree in special education in school administration from Columbia University.

Steven H. Rosdal '68 of Denver, Colo., has retired as co-founder and CEO of Hyde Park Jewelers after more than 30 years in the company. Rosdal will stay involved in the Denver jewelry company's charitable activities and sponsorships through its Diamonds in the Rough Foundation. He will also be director of Hyde Park's private client group.

Michael F. Hogan, PhD '69 of Albany, N.Y., was unanimously confirmed by the New York State Senate as commissioner of the New York State Office of Mental Health. Hogan was previously Director of the Ohio Department of Mental Health.

Robert "Bob" W. Potter '69 of Boalsburg, Pa., is stepping down from his role as president of the Centre County Community Foundation, a position he has held since 2001. As president of this nonprofit foundation, he realized two goals: to improve the asset base and to make the foundation visible and accessible throughout the county. He is currently pursuing a new business venture.

1970s

Irving Pressley McPhail '70 of White Plains, N.Y., has been appointed as executive vice president and chief operating officer of the National Action Council for Minorities in Engineering.

Roy Eugene Baldwin Jr. '70 of Lancaster, Pa., has been hired by Pennoni Associates, Inc., as a senior engineer at its Camp Hill office.

Howard R. Jacobson '71 of Canandaigua, N.Y., helped form LHL Ventures LLC, along with partners Lauren Dixon and Louis Bivona. Their company is focused on cause marketing.

Saundra Yancy McGuire, MAT '71 of Baton Rouge, La., is director of the Center for Academic Success at Louisiana State University; she gave a guest presentation at McNeese State University's Quality Day in March 2007.

David R. Orden '71 of Blacksburg, Va., has been named director for the Global Issues Initiative in the newly formed Institute for Society, Culture, and Environment at Virginia Tech.

Robert P. Whitney '71 of Hingham, Mass., who is married with three children, is a candidate to become commissioner of the Recreation Commission in Quincy, Mass. Whitney has held both municipal and civic positions and works in management in the CVS Pharmacy chain.

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Mail to: Office of Alumni Affairs, 274 Roberts Hall, Ithaca, NY 14853-5905

Gift Membership to the CALS Alumni Association of the College of Agriculture and Life Sciences at Cornell University (great gift from parents to graduating seniors!)

To:

From:

News for Alumni Notes:

John W. Ball '72 of Aurora, Colo., has been hired as a regional manager for the U.S. Bank's Food and Agribusiness Division.

Marvin K. Harris, PhD '72 of College Station, Texas, received the Distinguished Service Award by the Entomological Society of America.

Joseph P. Krausz, MS '73, PhD '76 of Clemson, S.C., was named the department head of Clemson University's Department of Pesticide Regulation. Krausz was previously the head of Texas A&M University's Department of Plant Pathology and Microbiology.

Roger A. LeBrun, MS '73, PhD '77 of Kingston, R.I., has been named the recipient of the U.S. Department of Agriculture's 2006 Northeast Regional Award for Excellence in College Teaching for his work as a professor at the University of Rhode Island.

David M. Schwartz '73 of Oakland, Calif., is the author of nearly 50 children's books (many of which are award-winning). He recently spoke to students at Friendship Elementary School about the importance that mathematics will play in their lives.

Steven N. Handel, MS '74, PhD '76 of Irvine, Calif., the lead ecologist on the Orange County Great Park Design Studio, has been appointed adjunct professor of Ecology at the University of California, Irvine.

William E. Rhodes III '75 of Menlo Park, Calif., was elected to the board of directors of California Healthcare Institute, a nonprofit public policy research organization.

Kathleen A. Blanchard, MS '76, PhD '84 of Lexington, Mass., is president and co-founder of Intervale Associates.

Meryl R. Kaynard '76 of Port Washington, N.Y., was appointed one of 13 new commissioners of the NYC Commission on Women's Issues by Mayor Michael R. Bloomberg. Kaynard is a senior vice president and associate general counsel at JPMorgan Chase where she provides legal advice on employment issues.

Daniel L. Galt, PhD '77 of Modesto, Calif., has a son, Ryan, who is carrying on the Cornell tradition by doing a post-doc in the College of Agriculture and Life Sciences. Galt is director of research for Hulst Research Farm Services, Inc.

Thomas J. Lally '77 formerly of St. Paul, Minn., was appointed general manager of the Asia-Pacific Region at Imation, a data storage manufacturing company. Lally and his wife, Kathy, have relocated to Hong Kong.

Eldredge L. Bermingham, Jr., '77 of Panama, has been named acting director of the Smithsonian Tropical Research Institute where he will oversee the world's premier tropical biology research institute.

Stephen Lloyd Arnold, PhD '78 of Fitchburg, Wis., is a candidate for the 4th District of the Fitchburg City Council. Arnold is the president of Arnold Consulting and has already served a two-year term on the City Council.

Frederick W. Bach '78, MPS '80 of Morrisville, N.Y., was presented the Morrisville State College Distinguished Faculty Award for his dedication to his students. The honor was awarded at the college's 96th commencement and is given to the faculty member who has displayed professional growth and personal and professional achievement.

Janet Smith Moore MPS '78 of a Asheville, N.C., was named Nonprofit PR Executive of the Year by PR News, a national public relations trade publication. As director of communications and marketing at Mission Health and Hospitals, Moore was honored for her work handling the change in CEOs.

Andrea Holtzman Drucker '79 of Malvern, Pa., was appointed general counsel and corporate secretary at PuriCore, a developer of human biological technology.

Thomas J. McGrath '79 of Columbia, Pa., has been named a director of Union National Financial Corporation and its subsidiary, Union National Community Bank.

Eufemio T. Rasco, PhD '79 of Laguna, Philippines, headed a group of local researchers at the University of the Philippines at Mindanao, where a rare carnivorous plant was found.

1980s

Melanie J. Marlett '80, MPS '82 of Washington, D.C., was named the new country manager for Moldova by the World Bank in May 2007. Marlett has just completed her assignment as World Bank Country Program Coordinator for Kenya, Eritrea, Somalia, Tanzania, and Uganda.

Susan E. Offutt, MS '80, PhD '82 of Rockville, Md., has been promoted to chief economist of the Government Accountability Office at the Economic Research Service.

Susan Wessler Schell, PhD '80 of Athens, Ga., is a faculty member at the University of Georgia's Franklin College of Arts and Sciences and been named a member of the American Academy of Arts and Sciences.

Dr. Donald E. Phykitt '81 of Athens, Pa., has a seven-year-old daughter, Katie. He is a medical doctor specializing in family practice with the Guthrie Clinic in Sayre, Pa.

Scott B. Richards '81 of Boston, Mass., has been appointed senior high-yield portfolio manager of the Global Fixed Income Group at State Street Global Advisors, an investment management firm.

Robert Clark, PhD '82 of St Louis, Mo., was named the vice president of research of Tripos Discovery Informatics, a leading provider of discovery informatics software.

Desiree P. Jellerette '82 of Los Angeles, Calif., has joined the Select Film Fund, a fund targeted at $1 billion. Jellerette has worked with film productions with budgets from $500,000 to $40 billon. She has worked with notable Hollywood film producers such as Spike Lee and M. Night Shayamalan.

Ronald S. Ronsvalle '82 of Lansing, N.Y., president of Perfect Painters/Heritage Builders, Inc., and Heritage Park Town Homes, Inc., recently received his Certificate Graduate Builder designation from the National Association of Home Builders, which identifies individuals who exemplify professionalism in the building industry.

Bradley J. Baker '83 of Wyncote, Pa., won the Pennsylvania Landscape and Nursery Association (PLNA) Excellence in Design Award. He also was invited to display his work at this year's prestigious Philadelphia Flower Show. He is the father of **Audrey Baker '09,** currently a CALS student.

Irene S. Burgess '83 of Eureka, Ill., was named Eureka College's provost and dean in January 2007. She was previously an associate academic dean at Wilmington College in Ohio.

Anne E. Hoskins '84 of Bethesda, Md., was named vice president of federal affairs and policy by the Public Services Enterprise Group.

Samuel Hunt Angell '86 of Dummerston, Vt., joined the law firm Gale, Corum, Mabie, Cook & Prodan in January 2007.

James A. Tantillo '87, MS '94, PhD '02 of Trumansburg, N.Y., has been named the executive director of the board of directors of Historic Ithaca. He and his wife, Wendy, live in a restored farmhouse with their two children and many animals in Trumansburg.

Jerry Yang Xiangzhong, MS '87 PhD '90 of Storrs Mansfield, Conn., professor and director of the Centre for Regenerative Biology at the University of Connecticut, believes that China could be a leading center for cloning techniques to be used to treat degenerative diseases.

Gisela Felizitas Erf, PhD '88 of Fayetteville, Ark., was awarded the Avian Immunology Professorship by Tyson Foods, Inc. Erf is a professor of poultry science and one of the nation's leading scientists studying the immune system of poultry.

Albert J. Medwar '88 of Morrisville, N.C., is the new vice president of marketing at BioDelivery Sciences International, Inc., a specialty pharmaceutical company. He was formerly the head of oncology marketing at EMD Pharmaceuticals.

Thomas A. Raqa '88 of Dayton, Ohio, former state representative from Mason, now works for Sinclair Community College as its senior director of strategy and regional development.

Donald E. Trimbur, PhD '88 of Menlo Park, Calif., was named senior director of bio-fuel development at Solazyme, a leading algal biotechnology company. As a metabolic engineer and microbiologist with over 20 years of experience, Trimbur is an inventor on numerous patents and patent applications in his field.

Kevin L. Cook '89 of Naples, Fla., wed **Lisa L. Cook '82** in November 2005. They both work as vegetable breeders with Syngenta Seeds, Inc. He is a pepper breeder, and she is a tomato breeder.

1990s

Lee S. Altier, MS '90, PhD '92 of Chico, Calif., is a professor at Chico State University. Twenty five years ago, Altier went to Nepal to promote fruit production.

Kathryn Dean-Bradley '91 of Landenberg, Pa., was newly hired by the accounting and consulting firm Belfint, Lyons, & Schuman P.A.

Alarik F. Myrin '91 of Duchesne, Utah, is finishing a pipeline project that will replace two open canals and provide pressure for a sprinkler irrigation system.

Kimberly S. Bostwick '92 of Trumansburg, N.Y., was featured in the 17th annual H. O. Burdick Lecture in Biology.

Jyotsna Kapur, MPS '92 of Carbondale, Ill., was selected by the Southern Illinois University's College of Mass Communication and Media Arts to be one of nine faculty members to receive one of the university's "Excellence through Commitment" awards.

Dr. Benito V. Marrufo '92 of Kingwood, Texas, recently joined Kelsey-Seybold's Kingwood Clinic in their internal medicine department.

Dr. Gerald R. Gorman '93 of Buffalo, N.Y., has been appointed chief of emergency services at Niagara Falls Memorial Medical Center.

Jeffrey J. LeBlanc '93 of Scottsville, N.Y., and his wife, Cissy, have three children: a six-year-old son named Jacob, a four-year-old daughter named Caroline, and a two-year-old daughter named Audrey.

Dr. Jennifer Marie Salm '93 of Middletown, R.I., is engaged to marry Dr. Eric Brett Radler in September 2007.

Carol L. Adams '95 of Wes Shokan, N.Y., was recently hired as marketing coordinator and drafter at Erdman, Anthony, and Associates, Inc., an engineering firm in Poughkeepsie, N.Y.

Dr. Michael Greger '95 of Des Moines, Iowa, director of public health at the Humane Society of the United States, spoke to Iowa State University students regarding large poultry confinements and its effect on the spread of avian flu.

Dr. John F. Diaz '96 of Beverly Hills, Calif., is starting his own plastic surgery practice. He is a forerunner on the Latino plastic surgery movement.

Boitshepo "Bibi" Giyose, MS '96 of Midrand, South Africa, was presented the Distinguished Alumna award by Appalachian State University. Originally from Botswana, Giyose returned to Africa as the senior food and nutrition security adviser for the African Union's New Partnership for Africans' Development. She also works with the United Nations and other similar organizations.

Michael S. Schlacter '96 of Ossining, N.Y., and his wife, Pamela, welcomed their new baby daughter, Emma Haley Schlacter, on June 5, 2007.

Linda L. Scheu '96 of Tucson, Ariz., along with her husband, Kevin, welcomed their son, Derek Alexander Greer, on March 2, 2007.

Kirida Bhaopichitr, MA '98 of Bangkok, Thailand, is a country economist at the World Bank's Bangkok office. She monitors the economies of Thailand, Malaysia, Laos, and Cambodia.

Richard Iuli, PhD '98 of Rochester, N.Y., was selected to participate in a rigorous training program entitled, The Climate Project, led by former Vice President Al Gore. Gore praised Iuli as "an outstanding example of the millions of Americans who have been energized by the call to action on the climate crisis." Iuli, an assistant professor at SUNY Empire State College, will be making presentations throughout central and western New York about global warming.

Meghan C. Schnader '98 of Jordan, N.Y., who owns Wake Robin Farm with her husband, is the secretary of the Town of Elbridge Planning Board and chairwoman on the Elbridge Ethics Committee.

Dean John Gurney '99 of Fairfield, Conn., is engaged to marry Julie Klecha. The couple is set to wed in September.

2000s

Sharon Anderson, MPS '00 of Lansing, N.Y., has been Cayuga Lake Watershed Network's steward for six years, the only full-time staff person focusing on the lake's welfare. She does so by increasing awareness about the importance of protecting the lake.

James P. Galloway '00 of Loxahatchee, Fla., is now the senior environment analyst at the South Florida Water Management District. Galloway monitors water quality and oversees habitats.

Effendi Gazali, MPS '00 of Jakarta, Indonesia, has produced a political satire Indonesian television show called News Dot Com, a show challenging the limit of freedom of expression in Indonesia. The show is being scrutinized by the Ministry of Information and Communications.

Army Capt. Jodi Sangster '00 of Edwards, Calif., was assigned to the Edwards Air Force Base for her first duty assignment.

Hojun Song '00 of Korea, received the John Henry Comstock Graduate Student Award from the Entomological Society of America in November 2006.

Shira and Zachary "Zach" Lippman '00 are living in Israel while Zach finishes his post-doctoral research in plant genetics. Zach has been growing giant pumpkins there and is getting a lot of local media coverage.

Michael Anthony Stefanone, MS '01, PhD '04 of Buffalo, N.Y., is now an assistant professor in the University of Buffalo's Department of Communication, focusing on human-computer interaction.

Adam P. Frank '02 of Merrick, N.Y. wed Rachel Hecht in August 2007. He is a product manager with Sterling & Sterling, Inc., an insurance firm in Woodbury, N.Y.

Julie Anna Kelsey '02 of Lapwai, Idaho, is engaged to marry Peter James Wittman in Chittenango, N.Y.

Briana Linne Collins '03 of New York, N.Y., was appointed executive director of the NYC Commission on Women's Issues by Mayor Michael R. Bloomberg. Collins previously worked as the Commission's deputy director.

Katie Nelson Schoenberg '03 of Ithaca, N.Y., married Jonathan Schoenberg '03 (Eng) on September 30, 2006, in Sage Chapel. She recently finished her MS degree in animal science in December 2006 at the University of Maryland. They have relocated to Ithaca and both have begun PhD programs at Cornell.

Reva Marie Squire '03 of Columbus, Ohio, was named a recipient of the 2007 National Association of Black-Owned Broadcasters (NABOB) DaimlerChrysler Management Fellowship, a two-year initiative designed to foster the development of African Americans and other minorities who have the talent and desire to be radio and television station owners.

Laura A. Borden '05 of Arlington, Va., began working as a marketing assistant at the Washington, D.C., office of Ayers Saint Gross, an architecture and planning firm. The firm is based in Baltimore, Md. Borden works with two other Cornell alumni. She lives in Virginia with her boyfriend, Matt Millane '05 (Hotel).

Sherida R. Porpiglia '05 of Norwalk, Conn., completed an MA in organizational communication in August. She is a project manager with Reed Exhibitions.

Angelo Anthony Quattrocchi '05 of Liverpool, N.Y., is engaged to marry Sara Raye Moore. The wedding is set for June 2008.

Yasin Senbabaoglu '05 of Ann Arbor, Mich., just finished his MA in statistics at the University of California, Berkley, and is off to the University of Michigan in Ann Arbor to begin his PhD in bioinformatics.

Selena Tinga '05 of San Luis Obispo, Calif., is working at the Atascadero Pet Center as both a veterinary technician and a laboratory technician. She is planning to go to vet school this fall.

Craig S. Weinstein '05 of Monroe, N.Y., has been working for the Weitz & Luxenberg law firm in Manhattan. In August, he started dental school at the University of Medicine and Dentistry of New Jersey.

Jennifer Hillman '07 of Hartford, N.Y., joined the public relations division at MRA in Syracuse as an account executive.

Prepared by Emily A. Réjouis '08

Lindsay France/University Photography

End Note

Modern Mann

The original Mann Library building reopened its front doors at the end of August, marking the near-completion of a four-year renovation project and the end of seven years of operation in the adjacent library addition.

In contrast with the hot, dark, and cramped quarters that prior generations of Cornellians may remember, the new and improved Mann is spacious and filled with light, exemplified by an airy, five-story atrium and study areas that are roomy and air-conditioned.

The original 1950s-era library "was a hardcore study spot—you really had to want to be here," says public services librarian Jim Morris-Knower.

Wooded areas just beyond the windows are a serene backdrop to the stacks and study areas, and there are views of the Centennial Garden and Beebe Lake.

Four new computer classrooms will open in spring 2008. The entire facility is wired for computer networking, and seminar and conference rooms will accommodate distance learning and videoconferencing, examples of the modern infrastructure added to the building by renovation architects Beyhan Karahan and Associates.

The renovation also preserves and enhances the Art Deco architectural details of the library, which was designed in the 1930s. (Construction was delayed until after World War II; Mann first opened its doors in 1952.)

On the top two floors of Mann, the Department of Plant Biology's Liberty Hyde Bailey Hortorium, faculty offices, labs, and classrooms also have been part of the renovation. The Hortorium's research facilities also include a library, conservatory, and herbarium with a collection of 845,000 plant specimens.

An exhibition gallery on the second floor will showcase class projects by students in CALS and the College of Human Ecology, and occasional art exhibits.

"One of our goals has been to connect science and art," says Mann Library Director Janet McCue.

Services and features unique to Mann Library include the Ellis Collection of "cultural reading" and special collections on bees and beekeeping, plant pathology, "The Language of Flowers" (Victorian-era culture), and more.

Just off the main lobby, the Manndible Café will offer a menu of locally grown food. Patrons can find another kind of sustenance in the daily haiku and tanka poems posted near the New Books section. The poetry feature, a 20-year tradition at Mann, is the brainchild of access services supervisor Tom Clausen. "He wanted to add another touch of beauty to the stacks," McCue says.

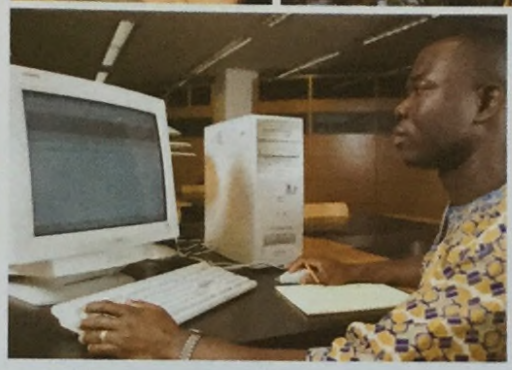
For more about the renovation, including a virtual tour, visit www.openhouse.mannlib.cornell.edu.

Daniel Aloi

CALS CREATIVE WAYS TO GIVE

Charitable gifts provide essential support for the College of Agriculture and Life Sciences each year. The following examples show opportunities to support the College by addressing tangible needs such as equipment, travel funds, scholarships, furniture, and more.

The CALS Development Office is available to help you explore creative ways to meet your personal and philanthropic goals while making a significant impact on the College. For more information or to make a gift in support of one or more of these priority needs, please contact Mike Riley, Associate Dean for Alumni Affairs, Development, and Communications, College of Agriculture and Life Sciences, at calsgiving@cornell.edu or (607) 255-7635.



Dean's Discretionary Fund.
Dean Henry relies greatly upon unrestricted gifts of any amount to meet critical needs and support emerging priorities across the college.

Wild Chronicles.
Help Shoals Marine Laboratory and the Cornell Laboratory of Ornithology develop HD multimedia educational products focused on seabird biology and conservation. To be aired by National Geographic. $8,000 (Shoals Marine Laboratory/Cornell Laboratory of Ornithology)

We will meet you there!
A 3-day, 2-night trip to Long Island would be an ideal experience for students to gain an appreciation for the scope of vineyard and winery operations in that region of the state. $5,000 (Horticultural Sciences)

Coyotes on the air.
Support a 5-year research project by purchasing a Global Positioning System (GPS) collar for a suburban coyote study in Westchester County. $2,200 (Natural Resources)

Green is beautiful!
Help the Department of Horticulture purchase plants for students to use as they learn how to beautify the campus grounds. $2,000 (Horticulture)

Aim for the big screen.
More and more student projects are going digital, and Mann Library's new Student Expo program needs new technology to showcase work in this medium. Funding for an oversized LCD monitor dedicated to student project displays will give this work the spotlight it deserves. $5,000 (Mann Library)

Moving images.
A digital video and two digital still cameras for the department to record student projects, community presentations and workshops, art events, and other ephemera. $2,200 (Landscape Architecture)

Wheels for Field Research.
Purchase a minivan or small size pick up truck to support field research on apples, grapes and vegetables. $18,000 (Horticultural Sciences)

Here we go again!
Help CALS Admissions upgrade their traveling exhibit for use in recruiting at agricultural events across the country. $3,000 (CALS Admissions Office)

Weave it!
Help the Cornell Plantations Education Department teach elementary school children how to weave together straw and other organic material in order to learn about weaving during our plant-based projects, with the purchase of two hand looms. $300 (Cornell Plantations)

Lights, Camera!
Install a data project and document camera in a Kennedy Hall communication classroom. $5,000 (Communication)

Minority Talent.
Sponsor the student-led orientation program, SUMMIT—Session for Undergraduate Minorities in Management: Investment in Talent. $500 (Applied Economics and Management)

On the Road Again!
Purchase an LCD projector for maple producer and forest owner extension education statewide workshops. $1,200 (Natural Resources)

Get me there!
Support for an enology student to attend one of the annual meetings of the American Society for Enology and Viticulture or the American Wine Society. $3,000 (Food Science)

Let's go wireless.
Install Red Rover on the first floor of Morrison Hall to provide wireless internet access to undergraduate students. $3,000 (Animal Science)

What's the Buzz?
New insect display cabinets are needed for teaching and outreach in Comstock Hall. $6,000 (Entomology)

A hub of activity!
Help support our graduate and undergraduate students with travel and research funding as they design experiments, analyze data, and publish academic papers. $3,000 (Communication)

Running trail around Beebe Lake

Stay connected via E-mail!

- Are you interested in receiving updates and the latest news from CALS and Cornell?
- Would you like to receive invitations to local alumni events via e-mail?

If so, please send an e-mail to us at alsaa@cornell.edu and we will send you a link to update your e-mail and address information for us.

Visit the college's new web site at

www.cals.cornell.edu

Cornell University
College of Agriculture
and Life Sciences

Alumni Affairs, Development, and Communications
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